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*Illustrated.

Important Santa Fe Development

The building of the Coleman cut-off in western Texas, described in another column, marks the completion of one of the most important railway developments which have taken place in this country in recent years. When the present management came into control of the Santa Fe, the main line between Chicago and the Pacific coast, included some portions with very heavy grades, especially between Trinidad, Colo., and Albuquerque., N. Mex. The Belen cut-off from Newton, Kan., to Belen, N. Mex., which was completed in 1906, provided an alternate low grade route over which most of the rapidly increasing freight traffic to and from the coast now moves. Another unfavorable situation existed in respect to the handling of traffic between the Pacific coast and Galveston, and other eastern Texas points. The Coleman cut-off between Texico on the Belen line and Coleman eliminates the necessity of hauling this traffic up through southern Kansas and reduces the mileage via the Santa Fe lines about 360 miles. This latter haul was such as practically to eliminate the Santa Fe from competition for this business. However, with the completion of this cut-off the road has a line not much longer than that of the Southern Pacific to Los Angeles and shorter to San Francisco, enabling it to become an active competitor with the Southern Pacific for traffic between the coast and east Texas points.

Safety First and the Automobile

From time to time the *Railway Age Gazette* has made comparisons of the statistics of automobile accidents and the statistics of railway accidents. The recent publication of the figures regarding accidents in the streets of New York City in 1913 show that automobile fatalities in that city are increasing with appalling rapidity. The last whole year for which accident statistics of the Interstate Commerce Commission are available is the year ended June 30, 1912. In that year the railways of the United States carried 994,158,591 passengers, a total of 33,000,000,000 passenger miles. The number of passengers killed in *train* accidents—collisions, derailments, etc., was 139. The number of passengers killed in all other ways by stepping in front of moving engines and cars, by falling from engines and cars, etc.—was 179; making a total of passengers killed in all ways in the entire United States of 318. The number of persons killed in the streets merely of New York City by automobiles in 1913 was 302, or 117 per cent. more than the number of passengers killed in train accidents in 1912, and but little less than the total number of passengers killed in all railway accidents. Furthermore, the situation in respect to automobile fatalities is rapidly growing worse, the increase in the number in New York City being from 221 in 1912 to 302 in 1913, or almost 40 per cent. Some of our radical friends advocate government ownership of railways as a remedy for railway accidents in the country. The public owns and operates the streets and is supposed to afford protection to those who use them, levying taxes for that purpose; but the statistics indicate that from the standpoint of safety public ownership and operation of the streets is a lamentable failure. If we reasoned about the streets as do our Populist friends regarding railways we should begin an agitation in the name of safety for selling the highways to private corporations.

A Bill to Buy the Labor Vote

The *Railway Age Gazette* long has been an advocate of legislation for workmen's compensation. It commended the views expressed by President Roosevelt on this subject years ago at the Jamestown Exposition when most railway managers dissented from them. It has, therefore, regarded with satisfaction the progress of this legislation and the gradual development of an opinion among railway officers favorable to it. It favored the passage of the measure drafted by the Federal Accident Compensation Commission—a commission composed of members of both Houses of Congress and of representatives of both labor and capital, and whose recommendations were made after protracted and thorough investigation and study. But no man or publication having the true interests of the public at heart can endorse the Federal Workmen's Compensation bill now before Congress and which was discussed in these columns last week (*Railway Age Gazette,* February 6, page 279) by Frank V. Whiting, general claims attorney of the New York Central

Lines. The reasons why no fair or public-spirited man or publication can indorse this measure are clearly set forth by Mr. Whiting. As it now stands it provides for compensation for injuries and fatalities to railway employees in amounts which are utterly excessive. Its adoption would impose an unreasonable burden directly on the railways and indirectly on the public, which must pay railway rates. If the bill is passed as it now reads it will not be a measure of justice or equity, but one designed by members of Congress to purchase for themselves the organized labor vote at the cost of the travelers and shippers of the United States.

LESSONS FROM THE PITTSBURGH & LAKE ERIE

THE Pittsburgh & Lake Erie occupies a unique position in the New York Central system, of which it is a part as well as among the railways of the country in general. Its tremendous traffic, its high revenue trainload and its low operating ratio are described in another column in this issue. The strength of this road cannot be attributed alone to its geographical location in the Pittsburgh district for the Pennsylvania and Baltimore & Ohio were here long before the Pittsburgh & Lake Erie. The remarkable development of this property is attributable rather to the utilization of these natural advantages of location and traffic to the greatest degree.

This leads at once to a study of the form of organization. Theoretically the organization is departmental, in common with other New York Central lines. Practically, however, it is divisional with the various departments concentrated in the office of the resident vice-president. The early concentration of authority locally on the property in the hands of an officer of unusual executive ability and personality accounts in large measure for the company's unusual success. A full staff of officers below the vice-president, consisting of general manager, chief engineer, superintendent of motive power, superintendent, etc., each with his assistants and all devoting their entire time to this one line of 223 miles might be considered unnecessary, but the results secured indicate the efficiency of this close supervision and illustrates a serious deficiency on most roads.

The concentration of authority on the road has also had an important influence on its industrial development. The local officers fully conversant with the needs and opportunities of the property are more able to inaugurate measures for its betterment than one at a distance. Quicker action can also be secured in any negotiations with industries, an asset, the importance of which is generally realized, but not always seriously considered.

From an operating standpoint, the location and operation of the yards is of primary importance. The aim has been to classify all freight into solid trains for destination at small receiving yards located close to the place of origin of the traffic rather than to collect it at one large yard at some central point. After leaving the receiving yard the trains are kept out of intermediate yards and kept moving. While this plan is particularly applicable on the Pittsburgh & Lake Erie, with its large amount of low grade traffic, the same principle applies in large measure to general traffic, while with this method it may be necessary to hold cars in the original yard longer than where trains are made up for the next terminal only, the loss in time is more than offset at this second yard where the train is not broken up. Also the cost of switching, damage to cars and lading, etc., is materially reduced. There is room for considerable improvement and economy in this regard on most roads.

Another important point is the arrangement of cars in the train. The Pittsburgh & Lake Erie found that placing all the heavily loaded steel cars at the head end of the train not only reduced the damage to the lighter wooden cars but also enabled the train to be handled so much more readily that the tonnage was increased from 3,800 to 4,500 tons, or almost 20 per cent., with no expenditure for heavier motive power or the reduction of grades. While there is nothing new in this idea, a glance at the average freight trains on the various roads will show the opportunity for more intelligent making up of trains—all of which again illustrates the value of close supervision.

"SAFETY FIRST"

IN his article on "Safety First," published elsewhere in this issue, John McManamy well says: "The only solution of this problem (the prevention of accidents) is 'eternal vigilance' on the part of every officer and employee of the company, and a strict compliance with the rules to avoid such accidents." "Eternal vigilance" is necessary to see that the employees do not take undue chances in the performance of their work. They should be made to realize that the rules adopted by the railroads are to be enforced and obeyed, not only for the benefit of the roads, but for the benefit of the men themselves. Trainmen and switchmen either delight in "taking chances" or have become so calloused in regard to their own safety through long years of service that untiring work must be done to make them conform to the fundamental principles of "safety first."

Accident Bulletin No. 48 of the Interstate Commerce Commission, giving a summary of the accidents during the year ending June 30, 1913, shows that the number of employees killed or injured in the operation of trains has increased in the past three years from 3,163 killed and 46,802 injured in 1911, to 3,301 killed and 74,797 injured in 1913. There were 195 employees killed and 3,360 injured in coupling and uncoupling cars in the year ending June 30, 1913. Of these killed the greater number met their death because of losing their footing, of the accidental starting of the cars, and of miscalculating the speed of the approaching car. The greatest number were injured by having their fingers or hands caught between the uncoupling lever and the end of the car, by losing their footing when coupling or uncoupling moving cars, and by opening the coupler with the foot.

Other causes of accidents are falling from, and getting on and off, moving cars and engines. In the year ending June 30, 1913, 560 employees were killed and 16,005 were injured from these causes. Of these 146 were killed and 7,659 were injured while jumping on or off moving trains, cars or locomotives. Many of these accidents were due to direct violations of the rules, and could have been prevented had the men themselves taken the proper precautions and lived up to the rules.

Another important point is mentioned by Mr. McManamy in the last paragraph of his article. He suggests the appointment of railway inspectors for the inspection of the safety appliances and the locomotive boilers so as to reduce the number of defective cars and locomotives that are held out of service by the government inspectors. Some roads provide such inspectors, but too often there are not enough of them thoroughly to inspect all the equipment. Again, the inspection is not always what it should be, the local men again "taking chances" that the government inspectors will not find the defects. This, of course, it will be granted, is very bad practice. Not only might it embarrass a road to have the government inspectors hold out equipment that it was urgently in need of, but when this must be done it is evidence that equipment is not being kept in proper condition. "A stitch in time saves nine" is just as applicable to railway equipment as to anything else. If this principle is followed it will not only show a saving in ultimate cost of repairs, but will keep the equipment in a more serviceable and safe condition.

In regard to the safe condition of the equipment, Accident Bulletin No. 48 shows that in the year ending June 30, 1913, 43 persons were killed and 1,017 injured on account of defective boilers, and that 49 were killed and 1,245 injured in 4,366 derailments, due to defective equipment. The damage done to the road and equipment, and the cost of clearing away the wreckage for these 4,366 derailments, amounted to $3,421,037, outside of personal damage claims. This money would surely have been put to better use if it had been spent for proper and careful inspection for the purpose of locating the defects in the equipment, before it was sent out on the road.

UNFAIR DISCRIMINATIONS AND THE RATE ADVANCE CASE

THE Interstate Commerce Commission appears to have taken the position that no advances in rates will be allowed in eastern territory until the railways have abolished some of the unfair discriminations of which numerous large shippers are the beneficiaries. The discriminations which the commission especially has in mind are those described and condemned by it in its opinion in the Industrial Railways Case (see abstract of opinion in *Railway Age Gazette*, January 30, 1914, p. 233). These take the form chiefly of the rendering by the railways of free switching services to certain industries; the payment to railways owned by industrial concerns of improper or excessive per diem reclaims or allowances for the rendering of switching or other services to the shippers themselves; the granting of excessive divisions of through rates to railways controlled by industrial concerns, and so on.

As to the existence of the discriminations mentioned, and others also, there can be no question. Every railway man, and every industrial traffic manager in the country, long has known of them, and of their purposes, causes and effects. The *Railway Age Gazette* repeatedly for years has referred to them in its editorial columns both generally and specifically; has denounced them, foreshadowed the time when they would arise to plague the railways and the shippers, and urged the parties directly interested to get together and abolish them. At last the Interstate Commerce Commission has turned its searchlight on them; the daily press has discovered the existence of iniquities to which this paper has been calling attention for years; and the whole case for advances in rates must be halted while the commission considers the bearing on it of conditions which have been notorious for years and which therefore ought to have been remedied years ago.

There are some people who think the commission is not justified in considering the question of these discriminations and that of a 5 per cent. general increase in rates at the same time. As a matter of fact, the commission seems to be doing exactly right and to be acting for the permanent welfare of the railways and the public. The railways are asking for higher rates on the ground that their present revenues are inadequate. The commission would be remiss in its duty if, in investigating the railways' complaint, it did not inquire both, first, whether it be true that their revenues are inadequate, and, second, if they are, why this is so. And if it should find that the railways' revenues are inadequate, but that this is not wholly because the general level of their rates is too low, but is partly due to the fact that they are unfairly discriminating in favor of certain shippers or communities, it would manifestly be the commission's duty to apply, if practicable, a remedy which would serve the double purpose of correcting the discriminations and supplying the needed additional revenues.

Meantime, it would be easy to visit too severe reprobation on the railways that have committed and the shippers that have benefited by the discriminations in question. They have been the natural and perhaps inevitable consequence of competition between the railways among themselves and the shippers among themselves. The railways could not have corrected them without getting together and agreeing. It is easy enough to say that they should have done this. But is it the policy of our law to encourage railways to get together and agree? Far from it. The law says that they must correct conditions which can be corrected only by agreement and concerted action, and then, in addition, it says that if they do agree and take concerted action it will put their officers in the penitentiary for violating the Sherman anti-trust law. Owing to these inconsistencies in the federal laws regulating railways—the reasons for and the wisdom of which are not appreciated anywhere except in Congress and the violent wards of the various state insane asylums—the Interstate Commerce Commission was the only body so situated that it could take the steps necessary to clean up the situation. And even the investigation made by the commission was made at the instance of the railways and shippers directly concerned, who freely placed before it all of the necessary facts in the case.

It does not follow, as some assume, that because the commission is dealing with the industrial railway matter and the rate advance question at the same time, there will be no general advance in freight rates. The eastern railways are asking for an increase which would amount to $45,000,000 or $50,000,000 a year. The commission roughly estimated in the opinion in the Industrial Railways Case, that the total cost to the eastern railways annually of the practices which it condemned has been about $15,000,000. It would be better for the railways and the public for them to get this amount by the abolition of the practices in question than in any other way. But if by means of the needed reforms they did get enough additional revenue and save enough expense to increase their net earnings $15,000,000 a year, they would need still further increases in their net earnings which apparently could be obtained only by a general increase in rates.

NEW BOOKS

Kansas Fuels: Coal, Oil, Gas. Engineering Bulletin No. 3 from the University of Kansas. Bound in paper. 6 in. x 9 in. 40 pages. Illustrated. Published by the University of Kansas, Lawrence, Kan. Copies free on request.

The heating values and proximate analyses of coal, as found in the different mines in Kansas, together with other important information concerning the mining and the general characteristics of the fuel are given in this bulletin. Similar analyses and information are also included in connection with oil and natural gas from the same regions.

Public Utilities, Their Cost New and Depreciation. By Hammond V. Hayes. Bound in cloth. 262 pages. 6 in. x 9 in. Published by D. Van Nostrand Company, 25 Park Place, New York. Price $2.

A very practical text book on the subject of valuation written by one who is well qualified to speak from an experience of several years as chief engineer of the American Telephone & Telegraph Company and as consulting engineer in valuation cases. The work aims to emphasize the fact that the fair present value of a property is dependent wholly upon the purpose of the appraisal. It is shown that the value to be assessed in the case of a projected sale is something quite different from that to be established as a basis of the reasonable rates that can be sanctioned by a commission or court. Thus, it is not the duty of the engineer to determine the fair present value; that is the duty of the public authority. The engineer's work is to ascertain the several elements, the replacement cost, the original cost, etc., which are the basis of the fair present value. The book describes the methods he should follow. The author argues especially in favor of the usefulness of the original cost, for he believes that it is much more easily to be determined and much more substantial a value than the cost of replacement. A large part of the book is naturally devoted to a consideration of depreciation. The point is made that depreciation is not "deterioration," but that it is a factor dependent wholly upon the relation of the age to the life of perishable property. "Each unit of plant, therefore, at the time of an appraisal can be figured as having a certain number of years of remaining usefulness out of a total life of an estimated number of years. At the end of a period of the serviceability of a unit, there will be little or nothing of value in the unit to represent the capital originally invested in it." In the book there are numerous citations from important cases. It seems to be the author's intention rather to follow these as precedents than to discuss the underlying theories of valuation or public regulation. That is a great advantage; it is such a great help to a clearer understanding of the matter by an engineer or one in general who is a layman to the legal theories involved. The book is divided into fourteen chapters, among which are: Replacement Costs of Physical Property; Determination of Replacement Cost; Value as a Going Concern; Original Cost; Reserves for Depreciation; Life of Plant; Depreciation; Fair Present Value—Rates; Fair Present Value—Condemnation or Sale. Each chapter in turn is divided into a number of headed sections, so that the book is given the added value of being a book of ready reference.

Letters to the Editor

THE VALUE OF AN EMPLOYMENT BUREAU

NEW YORK, January 19, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

There should be an employment bureau on every railroad division where there are a large number of men in the train service. From observations on my own division—which is one of the largest in the country—I have been convinced of this need for a long time; and your brief account of the establishment of such a bureau on the Baltimore & Ohio, published last week, at once raises a number of questions.

Is there no expert, other than the superintendent and his immediate assistants, at the different division headquarters of the Baltimore & Ohio? In other words, is there no employment expert except in the head office at Baltimore? Judging by what is plainly observable on many railroads, there is need of a much higher grade of ability in this matter (of engaging new men) than can be availed of by having one man—or even several men—at the headquarters of a large system embracing thousands of miles of road and a dozen or more superintendents. The well known evils of former days still exist, and are far too common. First-class men are rejected because they apply at a moment when no vacancy exists. The general substitution of machine methods in the railroad service, for the old personal and intimate contact, seems to be the means of leading officers to put up with too low a grade of man in many places and in many kinds of work.

Are not superintendents generally much too easy in allowing their chief clerks to attend to applicants for employment? To investigate the moral character of a man who in a few years may be a conductor or locomotive engineer, requires something more than machinery and routine methods. The best superintendent on the best road is none too good or too well qualified for making these investigations. Such part of the work as he may entrust to a young assistant should receive the master's constant oversight and supervision.

The employing officer should have a good knowledge of "human nature." This hackneyed phrase should be given its full meaning. The superintendent of 50 years is likely to be a much more capable man in this direction than the trainmaster of 35 or the chief clerk of 25 years. Is it not important to get the best in this feature? Some young men and boys seek employment on a railroad because they have a real enthusiasm for it; others apply simply because they are out of work. The first of these two classes should be encouraged; then it will be less necessary to accept those of the second class.

One reason why there should be an employment bureau on every large division is that the man who becomes expert in this preliminary feature, will appreciate the importance of keeping track of men in careful detail after they are put at work. The employing officer, if he be a man of human sympathy and sound judgment, will often be able to help a young recruit in such a way as to make the difference between failure and success in that young man's attempt to make himself a railroader. A considerable percentage of the men who are injured or killed in the train service are individuals who have been at work only a few months, often only a few weeks, and who have had incompetent or insufficient training. New recruits are too often left to shift for themselves; to not only learn their own lessons, but to discover by hard experience what lessons are most necessary to be learned. They ought to be watched, advised, encouraged.

I have read the paper which was presented at Boston by Mr. Basford, in which he deals with the question of apprentices. In the questions which I am here bringing to your attention, I am only applying to the train service the same principles which he advocates so convincingly for the shop service. It is not, perhaps, so easy to make an accomplished conductor out of a green brakeman as to make a skilful machinist out of a young apprentice; but this does not alter the duty of the employer to *do the best possible.*

The head of the employment bureau on a division must, of course, be subordinate to the superintendent. I am not trying to divide the authority of the head of the division. Everybody knows, however, that all superintendents of busy divisions are constantly overworked. Each superintendent needs a double. This employing officer should be that double; or one of them, if there is need of several "doubles." J. M. G.

RETRIBUTIVE PUNISHMENT

ALBANY, N. Y., February 3, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Thomas M. Osborne, a prominent citizen of this state, and former public service commissioner, was appointed recently by the governor to investigate the prisons of the state, and he went and lived for a week as a common prisoner at Auburn. Since that experience he has made a public address, in which he says:

"It can be demonstrated absolutely that the retributive system is so unfair as not to stand examination by any fair-minded person. It is impossible to accurately gage the motives or actions of anybody, so the absurdity of the courts trying to weigh the amount of a man's crime and mete out proportionate punishments is clearly apparent. Two people guilty of the same crime may be actuated by entirely different motives, and be in need of entirely different treatment. If punishment could be made precisely to fit the crime there might be some argument for the retributive system, but this cannot be done. When you consider how many judges there are, each with his own ideas and disposition, and each trying to bring order out of his own chaotic court, it will give you some idea of the hodge-podge of justice in New York state. There are some judges who will not only give different punishment for the same crime at different times, but will also on the same day deal out unequal punishment for the same crime. Hence the retributive system breaks down in practical operation. From the religious point of view, it is a most shocking thing that we tolerate a prison system founded on the theory of vengeance, for all our religious teaching is against it. 'Vengeance is mine, saith the Lord.'"

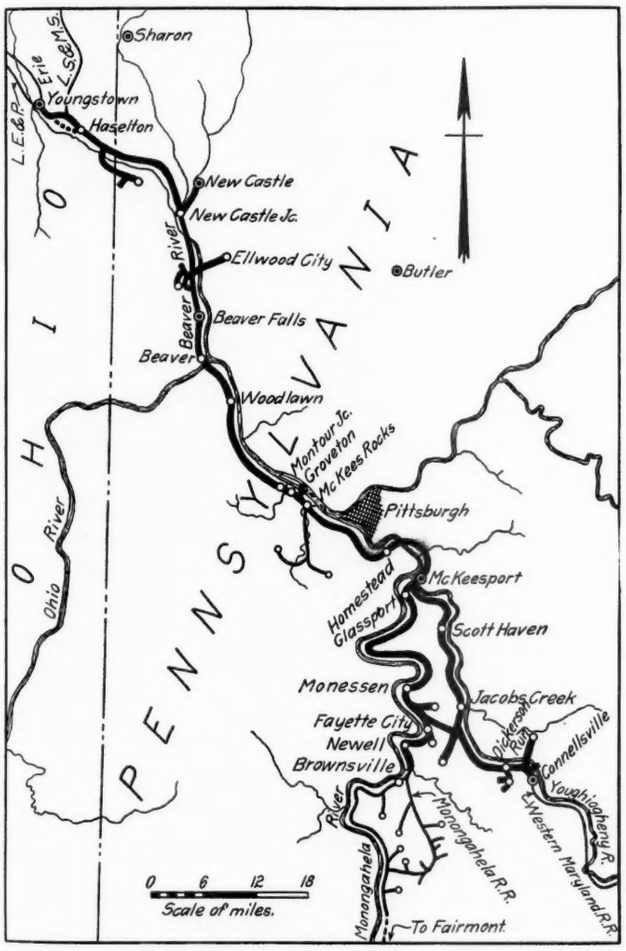
I bring this to the attention of yourself and your readers because of its bearing on railroad operation. When a servant commits an offense the master has a duty to correct or punish him. Questions concerning this duty were touched upon in connection with the discipline of the employees on the Baltimore & Ohio, which has lately been changed from punitive to corrective, and which you described in the *Railway Age Gazette* of January 16. In discussing this matter with officers of a number of roads within the last week, I have found that a common difficulty, from the general manager's point of view, is that superintendents will inflict punishment at times when their own minds are not calm. A suspension may prove a severe wound to the spirit of a man whose value to the company is such that to "break" him is a wrong both to himself and to the company, and it should be imposed only after deliberation. But anger, or a resentment which is akin to anger, is a thing which men of a pretty high grade sometimes find themselves guilty of; and that even a superintendent will do well to guard against it is illustrated in this statement of Mr. Osborne. Punishment for robberies, assault, arson, etc., is not like the punishment of trainmen for violation of railroad rules, and, of course, I am not comparing brakemen with burglars; but the principles here enunciated are applicable in both cases. The judges of the courts are educated to make justice and equity their mental meat and drink, day and night; if men thus trained make mistakes, the ordinary railroad superintendent may well look to his steps. The railroad officer who undertakes to punish a man who possesses any mental or moral character whatever, is assuming a grave responsibility.

A. F. M.

Studies of Operation—The Pittsburgh and Lake Erie

How Efficiency Is Secured in Handling the Enormously Dense Traffic of "Little Giant" of American Railways

The Pittsburgh & Lake Erie has a greater density of freight traffic than any other railroad in the United States. It has a larger average revenue trainload than any other road. And largely as a result of these conditions it also has a lower operating ratio than any road handling an equal amount of traffic. Although it entered the Pittsburgh district only 35 years ago, long after the Pennsylvania and Baltimore & Ohio had become firmly intrenched, this road of only 222.8 miles has made such a record for itself that it has been most appropriately termed "The Little Giant." This achievement stands out the more sharply when compared with the disastrous results that followed the latest invasion of the Pittsburgh district by the Wabash after an expenditure of $35,000,000. The intensive development of the Pittsburgh & Lake Erie can be studied with much profit for its problems differ largely in degree only from those of other roads.

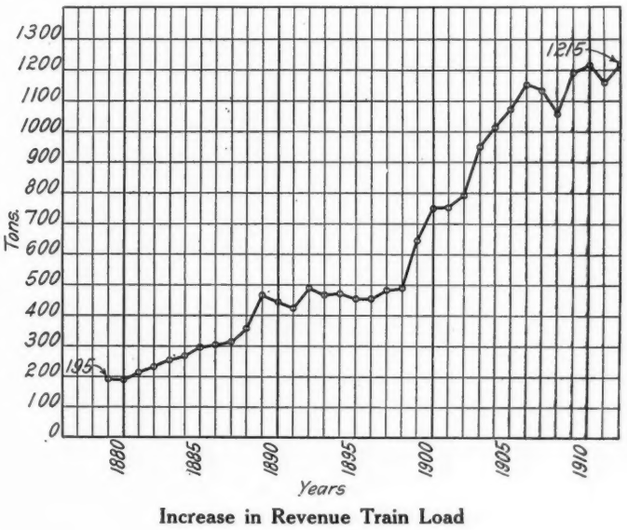


The Pittsburgh and Lake Erie Lines

LOCATION

The Pittsburgh & Lake Erie is strategically located in the Pittsburgh district, the greatest traffic producing center in the world. The main line extends from Pittsburgh northwest along the Ohio and Beaver rivers, 65 miles to Youngstown, Ohio. The Youghiogheny division extends southeast from Pittsburgh along the south bank of the Youghiogheny river, 57 miles to Connellsville. The Monongahela division runs south from a connection with the Youghiogheny division at McKeesport, 15 miles east of Pittsburgh, along the Monongahela river for 38 miles to Brownsville. These latter two divisions are connected by a seven mile cut-off from Whitsett Junction to Fayette City, which was built in 1912.

At Youngstown, connection is made with the Lake Shore & Michigan Southern, the Erie and the Lake Erie & Pittsburgh, the latter being a joint property of the Pennsylvania and the New York Central Lines. In addition to exchanging a large amount of mixed freight with these roads, the Pittsburgh & Lake Erie receives very heavy shipments of ore from Ashtabula and Cleveland during the lake navigation season. At Connellsville connection is made with the recently completed Western Maryland extension from Cumberland, providing a through line to Baltimore. This point is also the center of the large coke district bearing the same name. At Brownsville connection is made with the Monongahela Railroad, owned jointly by the Pennsylvania and the Pittsburgh & Lake Erie, and giving access to the extensive Klondyke coal and coke fields. Thus these three lines radiate from Pittsburgh, itself a tremendous traffic producer, into three different areas receiving coal, coke and ore.



Increase in Revenue Train Load

All three lines follow streams and are built with maximum grades of 0.3 per cent. The Youngstown line has four tracks except at a few congested points where they are reduced to two. The Connellsville line is double tracked for its entire distance, as is also the Brownsville division, with the exception of 2.5 miles near the south end. All three divisions are equipped with automatic signals spaced not to exceed 4,000 ft. All lines are despatched with telephones from the general offices at Pittsburgh. Treating plants are installed at all water stations.

HISTORY

The line from Pittsburgh to Youngstown was built in 1879, and those to Brownsville and Connellsville in 1883. In 1885 the New York Central Lines secured control of the property, and it has since been controlled by the Lake Shore & Michigan Southern, which holds a majority of the stock. It is operated, however, as a separate property under the direction of a vice-president at Pittsburgh, differing in this regard from other New York Central Lines, which are under the supervision of vice-presidents in New York and Chicago. Following the New

York Central Lines' practice in other respects, the organization on this road is departmental rather than divisional.

The rapid development of this road has seldom been equalled in the history of American railways. Starting with a property which was offered to the Pennsylvania for $2,000,000 and rejected by it less than 30 years ago, it has been developed until its net earnings in 1912 were over $9,000,000. Beginning with relatively few industries along its lines, its territory has been so extensively cultivated that the industries now tributary to the Pittsburgh & Lake Erie would, if placed side by side, extend continuously for 45 miles, or over 20 per cent. of the entire length of the road. A large proportion of these industries have been located along this line by the direct efforts of officers of the company. The location of the Jones & Laughlin Company at Woodlawn may be cited as one example. Previous to 1908 the revenue at this station amounted to practically nothing, and the freight and passenger receipts together did not exceed $25 per month. Through the efforts of officers of the Pittsburgh & Lake Erie, even to the extent of relocating their main line, this concern was induced to locate at this point, with the result that during the season of 1913 over 1,250,000 tons of ore alone were received in addition to the heavy tonnage of steel products outbound, all of which is secured by this road. The freight receipts at this station for one month alone have recently reached $237,000.

DENSITY OF TRAFFIC

This extensive industrial development in a district of great traffic possibilities has created a density of traffic on the Pittsburgh & Lake Erie which entitles it to a rank among railroads entirely out of proportion to its mileage. With only 223 miles of line it ranks third in the New York Central system in tons of freight hauled, exceeding both the Michigan Central and the Big Four, the latter having almost ten times as great a mileage. The mileage and tons of revenue freight hauled by the important subsidiary lines of the New York Central system are given below for the year ending December 31, 1912, all New York Central Lines reporting for the calendar rather than the fiscal year:

	Miles	Tons revenue freight
New York Central & Hudson River	3,791	51,901,182
Lake Shore & Michigan Southern	1,872	41,081,000
Pittsburgh & Lake Erie	223	32,372,112
Cleveland, Cincinnati, Chicago & St. Louis	2,012	25,816,649
Michigan Central	1,817	21,100,000

Even more striking is the density of freight traffic *per mile of road*. In 1912 the Pittsburgh & Lake Erie handled 9,111,019 ton-miles of revenue freight per mile of road. The only line in this country which approaches this record is the Bessemer & Lake Erie, with a density of 8,940,000 ton-miles per mile of road. The similar figures for the Pennsylvania Railroad was 4,925,296, and for the Lake Shore 3,813,000.

The handling of this dense freight traffic is further complicated by a heavy passenger movement, amounting to 514,602 revenue passenger miles per mile of line, 92 per cent. of which is local rather than interline traffic. The Bessemer & Lake Erie, with its heavy freight traffic, carried only 120,070 passenger miles per mile of line in the same year. The density of the passenger traffic on the Pittsburgh & Lake Erie will be better appreciated when it is stated that that of the Pennsylvania Railroad was 427,110; New York Central & Hudson River, 533,021, and Lake Shore & Michigan Southern, 402,000. These three roads are representative of trunk lines with heavy passenger business.

CHARACTER OF TRAFFIC

Over 75 per cent. of the freight traffic consists of products of the mines, principally bituminous coal, coke, ore and limestone; and 12 per cent. additional consists of finished steel products indirectly attributable to the same source. The largest single class of traffic is bituminous coal, which originates largely on the Monongahela division and in the vicinity of Scott Haven on the Youghiogheny division. Some coal is also secured from the Monongahela Railroad at Brownsville and from the Montour and Moon Run railroads at Montour Junction and Groveton. About 1,200 cars of coal are handled daily, nearly all of which goes to Youngstown for distribution throughout the west.

The second largest source of traffic is coke, which originates in the vicinity of Connellsville and on the Monongahela Railroad. About 700 cars of coke are handled daily, most of which is also bound for the west through Youngstown, although considerable quantities are shipped locally to mills in the Pittsburgh and Youngstown districts.

During the season of lake navigation the ore movement from Youngstown south to the mills in the Pittsburgh district and also to outlying points, such as Woodlawn and Monessen is very heavy, although contrary to the general impression that the Pittsburgh & Lake Erie is primarily an ore road, this traffic at no season furnishes the controlling movement, the direction of empty car movement being south. The ore traffic comes primarily from the Lake Shore dock at Ashtabula, the Erie dock at Cleveland and the Lake Erie & Pittsburgh dock at Lorain. The Pittsburgh & Lake Erie delivers all the ore used at the Jones & Laughlin plant at Woodlawn and at the plant of the Pittsburgh Steel Company at Monessen, while it also hauls its proportion of ore for mills in the Pittsburgh district reached also by other roads. The shipments to the Jones & Laughlin plant at Woodlawn alone average 250 cars daily during the season of navigation. Limestone furnishes another source of traffic, about 100 cars being secured daily from the vicinity of Newcastle and Youngstown for the mills in the Pittsburgh and Youngstown districts.

In addition to the direct products of the mines, 4,000,000 tons of finished steel products were hauled from the Pittsburgh district, destined mainly west through Youngstown, in 1912. A large amount of commercial business is also secured in this manufacturing center, over 250 cars of L. C. L. business alone being received daily. Since the inauguration of through service from the central west to Baltimore via Connellsville and the Western Maryland, making the Pittsburgh & Lake Erie a link in a trunk line, the through business to eastern ports via this route has increased rapidly until now about 125 cars are delivered daily to the Western Maryland and about 40 are received westbound. Obviously, practically all of this business is competitive traffic which otherwise would have moved over the Pennsylvania and Baltimore & Ohio.

THE OPERATING RATIO

While such heavy traffic would naturally indicate a low operating ratio, the ratio of 50.41 in 1912 is so low as to be very unusual. This figure is not a record made in this one year by the reduction of expenditures for maintenance of the property, but is typical of the average for a number of years. The ratio has fallen below 50 in several years and has gone as low as 40 for several months at a time. The full significance of this ratio can be better realized by a comparison with that of the Lake Shore, which is a road with unusually favorable natural advantages of location and traffic, and has long been recognized as being well operated. The operating ratio of the Lake Shore for 1912 was 65.46.

Being the relation of expenditure to income, the operating ratio of any road is necessarily dependent on the rates of income per ton mile and passenger mile as well as upon the economy of operation. Contrary to general impression, the Pittsburgh & Lake Erie is an originating rather than a terminal road, 74 per cent. of its traffic originating on its own lines as compared with 26 per cent. received from connections. Largely for this reason its average revenue per ton mile of 7.8 mills is relatively high, considering that such a large proportion is of low grade traffic. For example, the average rate of the New York Central is 6.0 mills, of the Lake Shore 5.3 mills, of the Michigan Central 6.6 mills, and of the Big Four 5.4 mills. On the other hand, its average haul is relatively short, being 63 miles in 1912 as compared with 192 miles in the New York Central, 167

miles on the Lake Shore, 153 miles on the Michigan Central and 158 miles on the Big Four. This short haul not only greatly complicates the work of handling even these large quantities of traffic economically, but also reduced the average receipts per ton in 1912 to $0.49, as compared with $1.16 on the New York Central, $0.88 on the Lake Shore, $1.02 on the Michigan Central and $0.86 on the Big Four.

OPERATING ORGANIZATION

Thus, the low operating ratio must be due in largest measure to economical operation. One of the most important elements in the successful administration of the property has been the vesting of broad central control in the vice-president located on the line who has devoted his entire time to the one road. This has enabled very close supervision of the many details to be maintained. It has also enabled a spirit of co-operation and close team work to be built up. There is usually closer co-operation between departments on small roads than on large ones, but that existing on the Pittsburgh & Lake Erie is unusual even on small roads. Numerous measures are taken to promote this spirit. One of these has been the installation of a small dining room in the general office building where the officers gather daily for lunch and discuss subjects of common interest to two or more departments. Another important feature has been the practice of providing attractive and wholesome surroundings as far as practicable for the employees at work in the belief that the employees will thus be led to take pride in their work and thereby become more efficient. This is found not only in the more important offices, but out along the line as well. In the blacksmith shop at McKees Rocks, for instance, the walls are whitewashed yearly and all fires are covered with hoods to remove the smoke as far as possible. Outlying station buildings and lawns are well maintained, in accordance with the same idea. While the results obtained by such methods are indirect and cannot be measured, they are nevertheless believed to be effective in the aggregate.

The average daily car movement on the Pittsburgh & Lake Erie is about 8,500 cars, of which 64 per cent. are loaded. The record movement for one day was made on April 20, 1913, following the floods of last spring, when a total of 10,050 cars, 6,072 loaded and 3,978 empty, were moved on this 223 miles of road. Of this number 5,564 cars were moved over the 65 miles of road between Pittsburgh and Youngstown, on short portions of which only one track was in service. Fifty-six passenger and 68 freight trains were moved over this branch in 24 hours without a locomotive delay of any kind. It is interesting to note that owing to the fact that the other roads in this vicinity were harder hit by the floods, the earnings of the Pittsburgh & Lake Erie showed a considerable increase for this month in spite of a total cessation of traffic for over two days.

YARDS

Because of the large number of important industries requiring prompt service and frequent switching and the large proportion of the traffic originating on the line, the organization of the switching service on this road is important. In spite of the fact that many large industries provide their own switching service after the cars are once set into their yards, the unusual condition exists that the switch engine mileage of the Pittsburgh & Lake Erie actually is greater than its total road locomotive freight and passenger mileage. The road owns 249 engines; and 100 engines and 130 crews are employed in switching service.

While at first glance it would appear logical to establish a large classification yard at the junction of the three lines at McKeesport in the outer limits of the Pittsburgh district and to bring all traffic into this yard for classification, the plan worked out on this road has been rather to locate smaller yards close to the points of origin of the traffic to collect all traffic as far as possible in trainload lots at these outlying yards, and then to send these trains through to destination or to connecting lines without entering intermediate yards. In this way the confusion and delay incident to the operation of large yards is largely eliminated and cars are kept moving as much as possible. In accordance with this plan, yards have been located at Haselton (Youngstown); McKees Rocks (Pittsburgh); Glassport, three miles south of McKeesport on the Monongahela division; Newell (Brownsville), and Dickerson Run (Connellsville). With the exception of the yard at Newell, these are all hump or gravity yards. Each yard is equipped with ample repair tracks and facilities for making all ordinary repairs to cars, to reduce delays and empty car movements.

The largest yard on the line is at McKees Rocks, and is for traffic destined to or originating in the Pittsburgh district, extending from McKees Rocks to Homestead. At Youngstown, ore and other traffic is received from the Erie, Lake Shore and Lake Erie & Pittsburgh, and is classified for destination. Trains are made up not only for each of the other yards but for as many of the industries as possible. Thus solid trains are made up for Woodlawn, Monessen, etc., and empties are collected into trains for movement directly to the mines and coke ovens. Likewise, separate trains are made up at Newell, Dickerson Run and Glassport for direct movement to the receiving yards of the Lake Shore and Erie at Youngstown without passing through McKees Rocks or Haselton. An average of 20 freight trains pass the McKees Rocks yard daily in each direction without entering. Likewise, solid trains of coke are made up at Newell and Dickerson Run for the National Tube Company at McKeesport, the Carnegie steel plant at Homestead and other intermediate industries, many of these trains operating as turnarounds, taking trains of empty cars back to the ovens. Such local traffic as must be handled in less than trainload lots is sent out of the various yards in station order.

Much coal originates all along the Monongahela division. To reduce light train mileage the yard at Glassport was built a few years ago for the collection and classification of this traffic originating between Newell and Glassport. Cars from the different mines and industries are brought to this yard by drag engines performing the switching service. Trains are then made up here for destination as at the other yards. A considerable amount of coal also originates in the vicinity of Scott Haven and Jacobs Creek on the Youghiogheny division. At present crews are sent out from Dickerson Run to pick up this traffic, or trains are sent out of this terminal with light tonnage and fill out with this coal. However, grading is now being completed for a new yard on this division a short distance south of McKeesport to be operated similarly to the Glassport yard, and upon its completion the terminal system will be complete.

TRAINLOADING

The revenue trainload of the Pittsburgh & Lake Erie is the largest of any important road in the country. In 1912 it was 1,215 tons and the average trainload of all freight was 1,300 tons. The Bessemer & Lake Erie again approaches the nearest to this figure with a revenue trainload of 1,038 tons. The Lake Shore approaches the nearest of any New York Central line with a revenue trainload of 693 tons and a total trainload of 731 tons. As the average revenue trainload is commonly regarded as a very important measure of efficiency of operation, it is interesting to note that this figure on the Pittsburgh & Lake Erie has been continually rising, as shown on the accompanying curve. Last year the increase was 56 tons. From this curve it will be noted that the trainload has doubled in the last 15 years.

Numerous measures have been adopted to secure this large loading, among which has been the routing of cars to give the minimum empty car mileage. This in itself has presented an interesting problem because of the large number of cars handled at the many intermediate points. Even during the summer months when large quantities of ore are coming into the Pittsburgh district and the coal movement is at its lowest level, cars must be hauled south empty to supply the mines. Also, the large numbers of high cars especially designed for coke service are unsuited for general commercial loading, and must be returned

empty to the ovens. To reduce the empty car mileage as far as possible, cars coming into the Pittsburgh district loaded with ore that are not required for outbound loading at the mills are sent on to the mines for return loading with coal. As these cars are loaded for points all through the west, the problem of car supply is frequently an important one.

This handling of empty cars presents an interesting problem in train movement requiring careful attention at all times. For instance, a crew bringing a train of ore from Haselton to Woodlawn will pick up a train of empty ore cars and proceed to Newell or Dickerson Run. Northbound a train from Newell with a few cars of coke for Monessen or for mills in the Pittsburgh district will set them out at these points, pick up a few cars of steel products and proceed to Haselton. At Monessen alone, 100 cars of finished steel products are classified and sent north daily in this manner to avoid delays incident to making up full trains for destinations. These shipments of finished steel products must be handled essentially as time freight. In the Pittsburgh district where such traffic can be made up into trainload lots, eight such preferred trains leave McKees Rocks for Youngstown regularly each night between 6 o'clock and midnight.

The making up of trains in the various yards also has an important influence on trainloading. In distributing cars for loading, steel cars are assigned for the heavier commodities, then in making up trains these heavily loaded steel cars are placed at the head of the train and no wooden cars are allowed near the front end or between steel cars. Before this practice became general on this road several years ago, the tonnage rating was 3,800 tons and delays were frequent, due to pulling out drawbars, etc. With the careful making up of trains the tonnage rating has been raised to 4,500 tons with the same locomotives, damage to equipment, and resultant delays have been largely eliminated and the trains are more easily handled. This rating of 4,500 tons applies on all three divsions and is limited only by car limits of 85 loads or 100 empties.

MOTIVE POWER AND EQUIPMENT

Efficient locomotives are of primary importance in handling this heavy traffic. The standard freight engine in road service is of the consolidation type with 22 in. by 32 in. cylinders, 50 in. drivers and 44,100 lb. tractive power. Reference has been made to the handling of the record traffic on April 20, 1913, without a single delay. The record from month to month is equally creditable. With an average movement of about 125 freight trains daily, only 14 engines stalled and 17 trains were given up in the month of September, 1913. During the entire month, 97 engineers reported no delays to their locomotives, in contrast with 21 who reported delays of some kind in this month. The average total daily detention to passenger trains chargeable to locomotives in July, 1913, was twelve minutes, and only 17 passenger trains reported any detention during the entire month. In May, 1913, this average delay was reduced to two minutes, twenty-nine seconds, with a scheduled passenger movement for the month of 3,405 hours.

The performance of the locomotives has been equally interesting from the fuel standpoint. With the summer rating of 4,500 tons, one ton of freight has been moved for each nine pounds of coal consumed. Stated in another way, trains were moved 13.7 miles for each ton of coal. While the number of cars in passenger trains has increased from 4.2 in 1903 to 5.0 in 1912, or 19 per cent., and the revenue freight trainload has risen from 951 trains to 1,215 tons, or 28 per cent., in the same period, the miles run per ton of coal has decreased from 15.9 to 13.7, or only 14 per cent. While the cost of maintenance per engine owned is subject to rather wide variations, it has decreased from $1,935.50 in 1903 to $1,762.17 in 1912. The unit cost of maintenance based on 1,000 lb. tractive power is $0.062 per month, a very low figure.

This road, like the Bessemer & Lake Erie was a pioneer in adopting the use of steel freight cars in large quantities. It now owns over 23,000 cars, or over 100 cars per mile of line, of which over 13,000 are of steel construction; and 5,300 additional are provided with steel underframes, leaving less than 5,000 of wooden construction. The average capacity of freight cars in 1912 was 42.9 tons, while the average number of tons of revenue freight per loaded car mile was 34.3 tons and the number of tons of all freight per loaded car mile was 36.74 tons.

THE FUTURE

That the same vigorous policy of intensive development of the property that has characterized its history so far is still being continued is evidenced by a brief outline of the improvements now under way. Probably the most important is the extension of the Monongahela Railroad and another subsidiary, the Buckhannon & Northern, also owned jointly by the Pennsylvania and Pittsburgh & Lake Erie, down the Monongahela river to Fairmont, W. Va. This extension will soon be complete and will open up for development within the next 10 years, new coal fields of over 100,000 acres, or more than twice the area of the famous Klondyke fields near Brownsville. The traffic originating within the area tributary to the Monongahela division should therefore increase very rapidly, most of which will go to Youngstown and points beyond.

As the coke industry has gradually been decreasing in the Connellsville district as the supply of coking coal is being exhausted, the Pittsburgh & Lake Erie has faced the prospect in the not far distant future, of having a high-grade double-track line from Pittsburgh to Connellsville on its hands without any considerable traffic. The traffic affiliation with the Western Maryland and the construction of the extension from Cumberland to Connellsville has entirely changed this situation and made this division a portion of a through trunk line. Although the Western Maryland extension has been open for freight only since August 1, 1912, about 165 loads are now exchanged daily at this point. With the construction of large elevators and other needed terminal facilities by the Western Maryland at Baltimore and with the traffic organizations of the New York Central lines and the Western Maryland behind it, this line should now receive a very material increase rather than a decrease in traffic.

At Youngstown a new belt line is now being built about the city at an expenditure of $4,000,000 to reach practically all the furnaces and other industries not now reached directly by the Pittsburgh & Lake Erie. This will give the road the most complete facilities of any line in this important industrial center and will eliminate the payment of switching charges to reach many industries as well as assist it in securing a greater proportion of the traffic in and out of these plants.

In the discussion of freight traffic one must not lose sight of the great promise of increased passenger business. The most important influences in this direction will be the through service via Pittsburgh and Connellsville to Baltimore. Although through passenger service was only inaugurated on October 27, 1912, trains are now run from Chicago, Toledo and Cleveland to Baltimore. As an indication of the possibilities in this direction, 28 special trains eastbound were handled over the line at the time of the Gettysburg celebration and almost an equal number were returned.

Any road is fortunate which has a combination of low grades, a heavy traffic density and a traffic adapted to collection and handling in large units. The efficient manner in which these natural advantages have been utilized by the management of the Pittsburgh & Lake Erie, has been, it is hoped, made sufficiently evident by the foregoing.

A NEW RAILWAY IN GREECE.—A contract has recntly been signed by the Greek Minister at Paris and certain French contractors for the construction of a railway connecting the Piraeus, Athens & Larissa railroad with the Oriental railroad. This line, which it is expected will be completed within eighteen months, will give western Europe direct railroad communication with Greece, and shorten the journey between Paris and Athens to 60 hours.

BRAKE TESTS ON THE PENNSYLVANIA*

BY S. W. DUDLEY

Assistant Chief Engineer, Westinghouse Air Brake Company

Realizing the significance of the knowledge and experience accumulated in recent years, the Pennsylvania Railroad, in conjunction with the Westinghouse Air Brake Company, instituted in the spring of 1913 the most scientific and comprehensive investigation of the different factors affecting the operation of brakes on steam railroad passenger trains that has been undertaken since the Galton-Westinghouse trials of 1878 and 1879. In addition to an examination of the characteristics of brake shoe friction throughout a wide range of laboratory and operating conditions, the test included also a study of the effect of various types of air brake mechanisms and foundation brake rigging and different degrees of emergency braking force.

The tests indicated the degree to which existing apparatus was suited to existing conditions, the direction in which improvement was necessary and could be made, and the amount of improvement actually accomplished.

The limitations of the old brake apparatus are most marked in the following particulars: In the length of emergency stops; the uniformity of brake applications on different vehicles comprising the train; the safety and protective features demanded by service conditions of great severity and complexity; the flexibility and certainty in applying and releasing the brake during service application; and the increased difficulty of keeping the service and emergency functions separate, i. e., insuring quick action when required on the one hand, and preventing it, when not required, on the other.

In considering the improvements desirable in the above particulars four factors require special attention:

The characteristics of the mechanism available for controlling the pressure of the compressed air in the brake cylinders.

The efficiency of the mechanical transmission of the force of compressed air developed in the brake cylinders, through the rods and levers of the brake rigging to the brake shoes.

The efficiency of the brake shoe in transforming the pressure imposed upon it into retarding force at the rim of the wheel.

The available adhesion between the car wheels and the rails.

There are four factors which have a controlling influence on the length of stop: (1) the maximum brake cylinder force; (2) the time in which this is obtained; (3) the efficiency of the foundation rigging in multiplying and transmitting this force to the shoe; (4) the mean coefficient of brake shoe friction.

All but the last factor, viz., the mean coefficient of brake shoe friction, can be controlled or properly provided for in advance by correct design and installation. On the other hand the experience of recent years has repeatedly demonstrated that no one of these four factors can be neglected without a corresponding loss in effective retarding force.

FEATURES OF EQUIPMENT TESTED

Air Brake.—The tests of the standard (type PM) air brake equipment were planned to determine the characteristic performance of this type of equipment throughout the range of service and emergency operating conditions typical of the ordinary service in which this equipment is in general use.

The special features of the improved air brake equipment (type UC) which received more or less attention during the tests may be summarized as follows:

The electro-pneumatic brake equipment is adapted to meet any requirement, from that exemplified in the PM brake equipment to the more exacting requirements of present conditions, with a degree of efficiency as high as the existing physical conditions will permit.

The equipment may be installed so as to produce any desired pressure, either in service or in emergency.

The gain by use of the electric control, in addition to the pneumatic, is the elimination of the time required for the pneumatic transmission of the action of the brake from car to car and, in addition the elimination of shocks and uncomfortable surging which results from the non-simultaneous application of the brakes on all cars.

It is apparent that the gain from the electro-pneumatic control is not so much in the shortening of the stop, particularly in emergency, as it is in the increased flexibility and certainty of control of the brake and the assurance that modern long heavy trains can be handled smoothly and accurately.

The troubles and inconveniences due to brakes failing to release, as well as the undesired application of brakes due to unavoidable fluctuations of brake pipe pressure when running over the road, are eliminated.

An adequate supply of air is available at all times.

The emergency braking power is available at any time, even after a full service application of the brake, since it is impossible for the engineman to use up the reserve emergency pressure without making an emergency application.

The equipment is adaptable to all weights of cars and to any desired percentage of braking power.

Brake Rigging.—Duplicate tests were made with the clasp brake rigging, two shoes per wheel, for every test made with the standard brake rigging, one shoe per wheel.

The test train was 1,040 ft. long, consisting of a Pacific type locomotive and tender of the Pennsylvania's K2s class, weighing in working order about 200 tons, and 12 P-70 steel passenger cars averaging about 61 tons each. The ET air brake equipment was used without any modification on the locomotive, except that in some tests an auxiliary device was used which increased the braking power obtained during the early portion of the stop.

Brake Shoes.—The standard plain cast-iron brake shoe was used in most of the tests. In several tests flanged, slotted and half area shoes were employed. Special care was taken to insure uniformity in quality and the condition of all shoes at the beginning and during the progress of the tests.

The tests, 691 in all, were made on the south bound track of the Atlantic City Division of the West Jersey & Seashore.

SUMMARY OF RESULTS

The improved air brake apparatus, operating pneumatically, shortens the time of obtaining maximum emergency brake cylinder pressure on the train as a whole from 8 sec., with the PM equipment to 3.5 sec. and with electric control this is again shortened to 2.25 sec. Moreover, 125 per cent., 150 per cent., or 180 per cent. emergency braking power is available as may be thought desirable or found permissible according to circumstances when the installation is made. The PM equipment has an average of 100 per cent.

Using 150 per cent. emergency braking power, the quicker and more powerful pneumatic emergency application shortened the stop at 60 m. p. h. from over 1,600 ft. to about 1,400 ft. and the simultaneous action of the electro-pneumatic brake still further shortened the stop to less than 1,200 ft.

With the PM equipment the attempt to make an emergency application during the progress of, or before releasing a partial or full service application will produce only the same stop as if merely a full service application had been made. Considering the ordinary full service stop from 60 m. p. h. (say 2,000 or 2,200 ft.) as 100 per cent., with the improved apparatus, operating pneumatically, an emergency application following a partial service application will shorten the stop about 14 per cent. and after a full service application about 10 per cent.; with electro-pneumatic operation the gain is 23 per cent. and 15 per cent. respectively. This is a safety factor of great importance.

Shocks during brake applications are due to slack action modified by speed. This was shown by pneumatic and electro-pneumatic stops from both high and low speeds. At speeds of from 60 to 80 m. p. h., the serial action of the pneumatic emergency application resulted in noticeable shocks which increased in severity at lower speeds and at 10 m. p. h. amounted, in effect, to a collision between the rear and forward end of the train, the train being stopped in 42 ft. The simultaneous

*Abstract from a paper presented at the New York meeting of the American Society of Mechanical Engineers, February 10, 1914.

application of just as great retarding forces by the electro-pneumatic brake eliminated violent slack action at all speeds, the stop even at 10 m. p. h. (37 ft.) being without shock.

Station stops and emergency stops with the old and the new air brake apparatus mixed in various ways in the train showed harmony in operation and improved general results, particularly when releasing brakes.

Comparative tests showed that when the improved air brake mechanism is used on the cars, an arrangement giving a high emergency braking power on the locomotive, with blow-down feature, reduces shocks due to unequal braking power and shortens the stops.

With the electro-pneumatic brake a uniform increase in maximum per cent. braking power results in a substantially uniform decrease in length of stop, the decrease amounting to about 2 per cent. for each 5 per cent. increase in braking power within the range of these tests.

The available rail adhesion varies through wide limits, e. g., from 15 per cent. in the case of a frosty rail early in the morning to 30 per cent. for a clean, dry rail at mid-day.

Wheel sliding depends more on the rail and weather conditions than on the per cent. of braking power. Some sliding was experienced with braking powers as low as 90 per cent. when rail conditions were unfavorable, but 180 per cent. braking power did not cause wheel sliding with a good rail.

Emergency Stops from 60 M.P.H. with Electro-Pneumatic Brake, 150 Per Cent. Nominal Braking Power

Kind of Brake Rigging.	Kind of Stop.	Stop Distance in Ft. Average.	Maximum.	Minimum.	Average Braking Power, Train.	Per Cent. Braking Power per Lb. Cyl. Pressure, cars.
Standard	Train	1,160	1,298	1,049	133	1.473
	12 car breakaway	1,228	1,291	1,178	143	1.473
No. 1 clasp	Train	1,204	1,273	1,157	135	1.499
	12 car breakaway	1,145	1,183	1,112	148	1.499
No. 2 clasp	Train	1,145	1,213	1,097	134	1.450
	12 car breakaway	1,136	1,178	1,073	141	1.450
No. 2 clasp	Single car breakaway	1,014	1,027	1,007	140	1.430
No. 3 clasp	Single car breakaway	924	1,010	873	149	1.505

Emergency 12 Car Train Stops from 60 M.P.H.

Brake Rigging.	Brake Shoes.	Air Brake Equipment.	Nominal Braking Power.	Stop Best.	Stop Avg.
Standard	Plain	PM	113	1,659	1,677
Standard	Flanged	PM	113	1,453	1,453
No. 1 clasp	Plain	UC pneumatic	125	1,405	1,443
No. 2 clasp	Plain	UC pneumatic	125	No tests	
No. 1 clasp	Plain	UC electro-pneumatic	125	1,338	1,339
No. 1 clasp	Plain	UC electro-pneumatic	150	1,157	1,204
No. 2 clasp	Plain	UC electro-pneumatic	125	1,317	1,332
No. 2 clasp	Plain	UC electro-pneumatic	150	1,097	1,145
No. 3 clasp	Plain	UC electro-pneumatic (estimated).	125	1,055	
No. 3 clasp	Plain	UC electro-pneumatic (estimated).	150	965	
No. 3 clasp	Flanged	UC electro-pneumatic (estimated).	125	935	
No. 3 clasp	Flanged	UC electro-pneumatic (estimated).	150	860	

The effect of excessive wheel sliding was to make the length of the stop about 12 per cent. greater than similar stops without wheel sliding.

An expression for the relation between the coefficient of rail friction fr, efficiency of brake rigging e, and per cent. of braking power P at the instant wheel sliding is about to occur, derived from the data of the best tests made is $P^{0.551} = \frac{8.33fr}{e}$

An efficient design of clasp brake rigging was shown to be necessary in order to avoid serious losses due to excessive piston travel, undesirable journal and truck reactions, brake shoe wear and variable shoe action.

The performance of the cast-iron brake shoe was shown to vary between wide limits, the ordinarily assigned causes for this variation (such as speed, pressure and time of action) becoming effective chiefly as they affect the temperature of the working metal of the brake shoe and wheel.

The amount of wheel and shoe metal in working contact during a stop is very small and is the most difficult factor to control. At the same time it is most potent in producing variations in brake performance.

The brake shoe bearing area and consequently the generation of heat in the working metal and the resultant coefficient of friction was shown to vary considerably during the progress of a single stop and to a greater degree as the fit of the shoe to the wheel changed due to warping or continued rubbing. Due to this effect alone the emergency stopping distance at 60 m. p. h. changed by as much as 20 per cent. This is evidence, however, that with reasonable attention to brake shoe maintenance the condition of the shoes on cars in ordinary road service is likely to be more favorable to making short emergency stops than during tests in which the brake shoes are worked severely.

Flanged shoes provide more available area for bearing than unflanged shoes and, when worn in, shortened the train stops about 12 per cent.

The use of two shoes instead of one per wheel will result in a higher coefficient of friction and less wear per unit of work done, the durability under clasp brake conditions being about 40 per cent. greater than under single shoe conditions.

The use of two shoes per wheel permits a design of rigging which will enable flanged shoes to be used without danger of pinching flanges and causing excessive flange wear or non-uniform brake forces which result when flanged shoes are used with rigid beam connections. The wear of flanged shoes is about 20 per cent. less than unflanged shoes.

From tests at 60 m. p. h. with clasp brake rigging, the relation between coefficient of brake shoe friction fs and per cent. of braking power P, was found to be $fs = \frac{0.12}{0.42}$. No satisfactory separate determination of brake rigging efficiency e, and co-efficient of brake shoe friction fs, was made during the road tests. The combined effect, $e \times fs$, was obtainable with reasonable accuracy from the best of the several stops made under various conditions as given in the accompanying table. The values for single shoe conditions are more uncertain than the clasp brake conditions due to less satisfactory data.

Values of $e \times fs$

Speed m.p.h.	Per Cent. Braking Power.	Clasp Brake Plain Shoe.	Clasp Brake Flanged Shoe.	Single Shoe[1] per Wheel. Plain Shoe.	Single Shoe[1] per Wheel. Flanged Shoe.
30	125	0.141	0.169	0.108	0.112
	150	0.129	0.154	0.099	0.103
	180	0.118	0.141	0.090	0.094
60	125	0.103	0.122	0.074	0.090
	150	0.094	0.112	0.068	0.082
	180	0.086	0.102	0.062	0.075
80	125	0.092	0.109	0.070	0.074
	150	0.084	0.100	0.064	0.068
	180	0.077	0.092	0.059	0.062

[1]Value of data uncertain due to non-uniform brake shoe conditions.

The length of emergency stop St, on a straight level track, neglecting air and internal friction on the one hand and the rotative energy of the wheels and axles on the other hand, can be calculated from the following formula:

$$St = 1.467\ Vt + \frac{V^2}{30Pefs}$$

in which

V = initial speed in m. p. h.

P = per cent. braking power actually realized

$e \times fs$ as determined by the existing brake rigging and shoe conditions (see table).

t = time at the beginning of the stop during which the brakes are to be considered as having no effect, to allow for the time element in the application of the brakes. For a 12-car train t ranges from 2.0 sec. to 2.5 with the PM equipment and from 0.70 to 0.85 sec. with the electro-pneumatic equipment.

A train of 12 steel cars and a locomotive with the electro-pneumatic brake, 150 per cent. braking power, clasp brake rigging and unflanged brake shoes can be stopped:

From 30 m. p. h. in 200 ft., equivalent to an average retarding force of 300 lb. per ton.

From 60 m. p. h. in 1,000 ft., equivalent to an average retarding force of 240 lb. per ton.

From 80 m. p. h. in 2,000 ft., equivalent to an average retarding force of 214 lb. per ton.

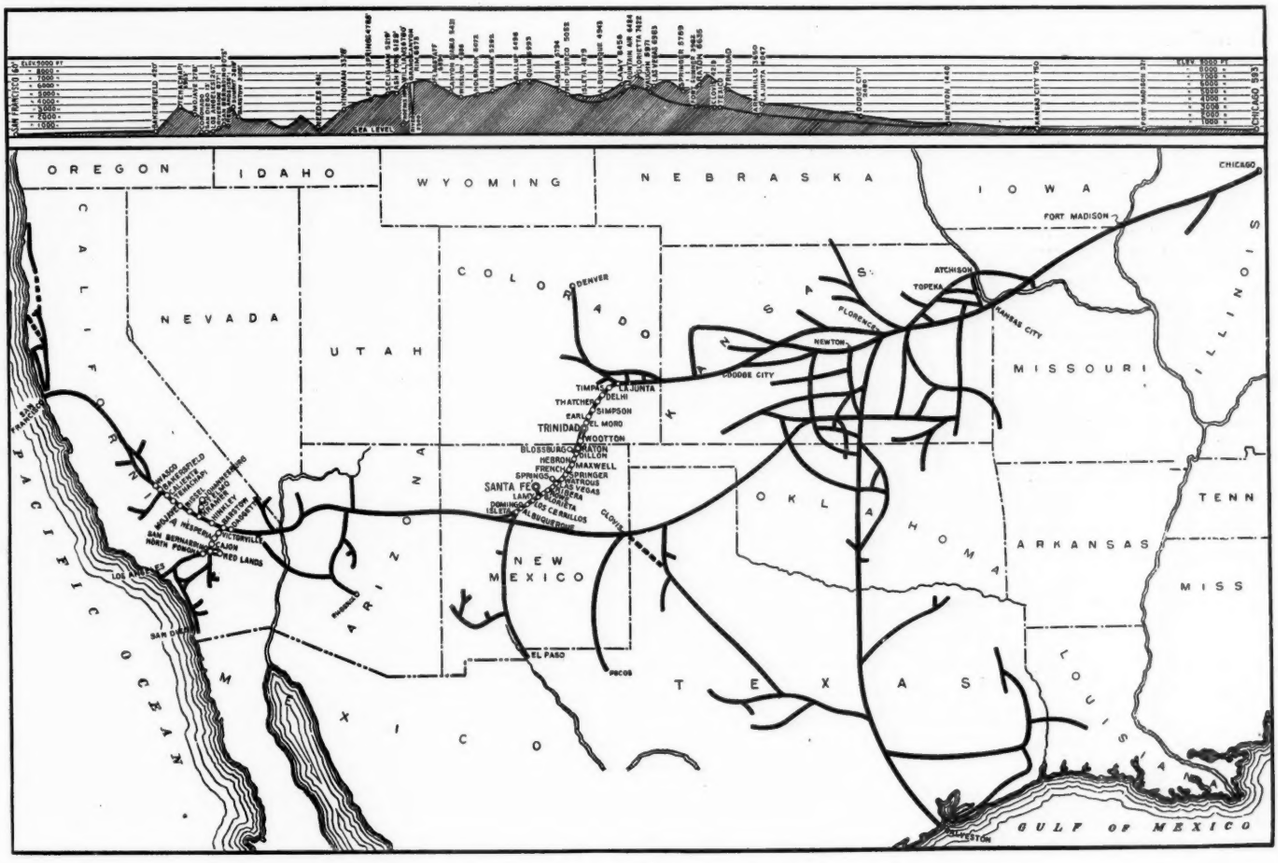
Electrification of Heavy Mountain Grades

The Proposed Electrification of the Raton Mountain on the Santa Fe Is Found to Be Unprofitable

By Joseph P. Ripley*

With the rapid development of the art of electric traction, together with the extensive electrification of European steam railways, as well as that of several sections of American trunk lines, the question of the use of the electric locomotive on heavy mountain grades has recently been given a great deal of attention and study. Among various forces which may be said to have had influence in bringing this subject to the attention of railway officials, may be included the development, actual and projected, of our water power sites, the increase in average trainloads, the increasing cost of fuel, the dangers and difficulties of operation through tunnels, the progress in the art of manufacturing electrical equipment, and the limited traffic capacity of single track mountain grades, together with the improved speed characteristics of the electric as compared with the steam locomotive. Due to these conditions, as well as the obvious advantages of electric over steam motive power and the savings in locomotive operating expense offered by the use of electricity, railway executives have directed their attention to the investigation of the use of electric power for the movement of trains over various heavy mountain grades in an endeavor to ascertain whether or not electric operation would result in sufficient saving of operating expenses, improved operation or increased capacity, to balance the increase in fixed charges due to the necessary investment in electrical equipment.

That portion of the Atchison, Topeka & Santa Fe between Trinidad, Colo., and Raton, N. M., is commonly known as the Raton mountain, and it is over this twenty-three mile section that the heaviest grades of the system are encountered and the maximum elevation above sea level is reached. Of all the lines owned by the Santa Fe this section would seem to be the most susceptible to electrification with resultant economy, it being due to this fact that the compilation of data and the writing of a somewhat preliminary report on the subject was brought about, of which report this article is a brief summary. The study was not intended to definitely conclude in favor of any one of the several electrical systems, if any, but rather to determine whether or not any of the electrical systems, together with any available source of power supply, offered sufficient opportunity for economy to warrant the making of a very detailed and complete engineering report on the subject.



Map and Profile of the Atchison, Topeka and Santa Fe

Consideration was only given to the electrification of the twenty-three mile section between Trinidad and Raton, it being over this portion that "pusher" engines are now in service. From Trinidad eastward the grades are considerably lighter than those of the proposed section to be electrified, and similarly from Raton westward as far as Glorietta, from which point to Lamy, however, there are grades of 3 per cent. opposed to eastbound traffic over a distance of about ten miles. The distance from Raton to Glorietta is nearly 166 miles, and the ruling

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grades over this portion of the line are 1.70 per cent. opposed to westbound traffic and 1.42 per cent. opposed to eastbound traffic; it is thus to be noted that, so far as very heavy grades are concerned, the profile of the company's lines does not lend itself very well to the electrification of an extensive zone.

The summit of the Raton mountain is about seven miles from Raton and about sixteen miles from Trinidad. Ruling grades, which are compensated for curvature, are as follows:

Trinidad to the Summit 3.50 per cent. (opposed to westbound traffic).

Raton to the Summit 3.32 per cent. (opposed to eastbound traffic).

The maximum curvature over the mountain is 10 deg., and it is estimated that about 50 per cent. of the line is on curves. The line over the Raton mountain is all double tracked at present, the second track having been constructed several years ago in order to provide requisite traffic capacity. Separate tunnels have been bored at the summit for east and westbound trains, the gradient in each being in favor of traffic movement; each tunnel is somewhat over 2,000 ft. in length.

The average daily tonnages including extra sections of trains moved over the mountain during May, 1912, were as follows:

Westbound		Eastbound	
Train No.	Train Tonnage	Train No.	Train Tonnage
1 (passenger)	600	2 (passenger)	470
3 (passenger)	600	4 (passenger)	564
7 (passenger)	545	8 (passenger)	507
9 (passenger)	448	10 (passenger)	676
31 (freight)	1,639(x)	32 (freight)	956(x)
39 (freight)	1,639	700 (freight)	956
701 (freight)	1,639	Extra (freight)	956
Extra (freight)	1,639	Extra (freight)	956
Extra (freight)	1,639	Extra (freight)	956
Extra (freight)	1,639	Extra (freight)	956

(x) Average tonnages of individual freight trains could not be calculated from available records. The average number of freight trains per day during May, 1912, was twelve, six being westbound and six eastbound, and the average tonnages per train were 1,639 and 956 respectively.

The "Santa Fe de Luxe" (number 19 westbound and 20 eastbound) did not run during the month of May, 1912; the weight of this train was estimated at 500 tons for the calculation of the requisite number of electric locomotives to handle the traffic.

The annual traffic tonnage moved over the mountain from July, 1911, to June, 1912, inclusive, was calculated from data at hand to be as follows:

Westbound traffic	2,720,000 tons
Eastbound traffic	1,915,000 tons
Total	4,635,000 tons

In preparing estimates of electrification, four sources of power supply were considered:

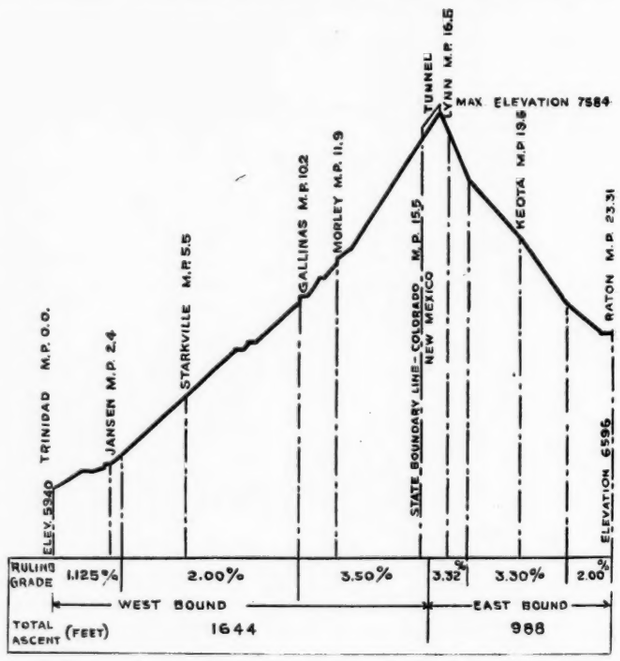
SOURCES OF POWER SUPPLY.

The first plan, in which it was intended to use coke oven gas for fuel under steam boilers in a plant constructed and operated by the railway was drawn up in view of the proposed erection of by-product coke ovens by the St. Louis, Rocky Mountain & Pacific, at its coal mines, which are about two miles from Raton. A more or less tentative agreement was reached, by the terms of which coke oven gas was to be delivered for two cents per thousand cubic feet to the railway company's power house, which was to be located near the coke plant, and the railway was to sell electric energy to the St. Louis, Rocky Mountain & Pacific at the rate of $1 per horse power of demand per month, plus a consumption charge of $.005 (½ cent) per k. w. h. It was estimated that in case the project were actually carried out and power offered at the above rates, the power demand of the mining company would amount to about 1,555 k. w. with an annual energy consumption of about 5,000,000 k. w. h. Power house estimates include grates and all coal burning equipment to be used in case of a shut down of the coke oven plant.

The second plan of power supply proposed was the same as the first, except that it included the use of coal instead of gas as fuel, this being in order to outline the aspect of the problem in case the St. Louis, Rocky Mountain & Pacific should abandon the proposed erection of by-product coke ovens, even if the electrification project proved attractive to the railway, with the use of gas at the tentative price agreed upon.

The other two plans of power supply involved the purchase of power rather than generation in a plant owned by the railway, the first being from the Trinidad Electric Transmission Railway & Gas Company, which owns and operates a commercial power plant in Trinidad, and the second from the Stag Canon Fuel Company, at Dawson, New Mexico. The latter is one of the Phelps Dodge group of mining companies; included in its property at Dawson is an underflue coke plant, the waste gases from which are at present only partly used in the generation of power. It was planned, in connection with the purchase of power from the Stag Canon Fuel Company, that the railway build a transmission line from Dawson to Raton and purchase energy measured at the power house switchboard in Dawson.

In view of the relatively high price of fuel oil in the vicinity, no estimates were prepared covering its use instead of coal or gas. A study was made of the only available water power site, this being about twenty-five miles below Trinidad on the Purgatory river, and the cost of development was found to be prohibitive.



Condensed Profile of the Santa Fe over the Raton Mountain

ELECTRICAL SYSTEMS.

The following four electrical systems were given consideration and cost estimates were prepared for each:

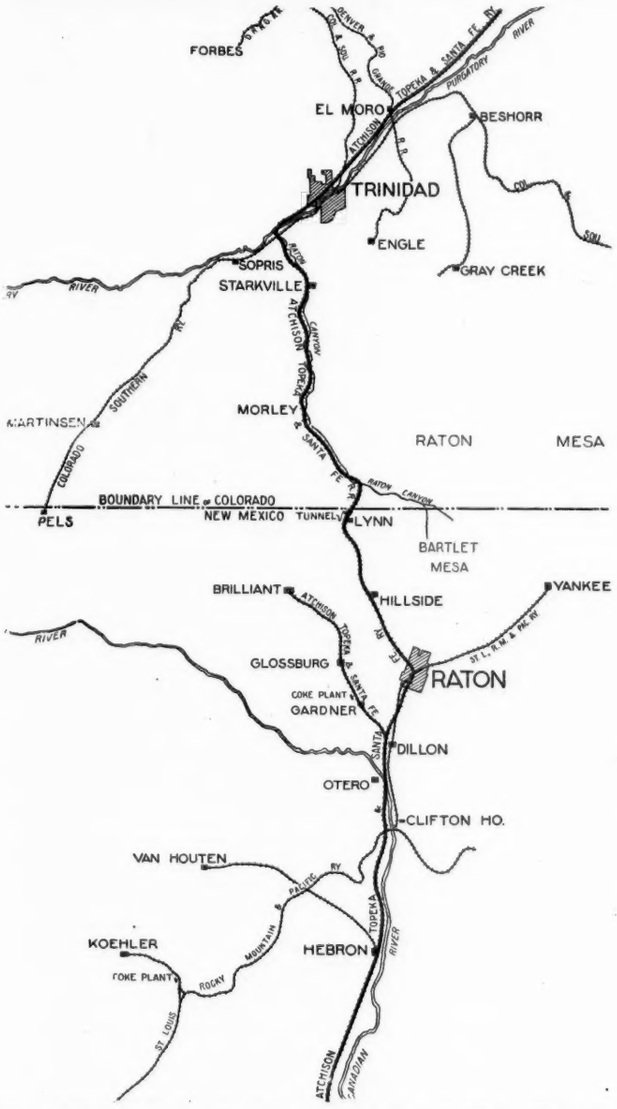
Direct current.....1,200 volts	Single phase.....11,000 volts
Direct current.....2,400 volts	Three phase..... 6,600 volts

Estimates were prepared for each of the four above named electrical systems in connection with each of the four proposed sources of power supply with the exception that, in the case of purchased power from the Stag Canon Fuel Company, no estimates for three phase operation were prepared, due to the fact that the power company would not submit prices unless the railway agreed to convert the power in substations in order to avoid low power factors.

The requisite power station capacity, for each of the schemes involving the construction of a generating plant by the railway, was calculated on the assumption that, at a time of congestion, it might be necessary to move simultaneously up grade, at speeds

of 12 and 15 m. p. h. respectively, two freight trains of 1,639 tons each and two passenger trains of 600 tons each. After allowing for line and conversion losses, capacity for the load of St. Louis, Rocky Mountain & Pacific and a spare unit, it was found that, in the case of each of the four electrical systems, a station containing four 3,000 k. w. units would be of ample capacity. In the case of the single phase system estimates were based on the use of single phase generators rather than the use of three phase generators with an idle terminal; power generation for the direct current and three phase systems was assumed to be by means of three phase generators.

In view of the scarcity of water in the vicinity, power station



Map of That Portion of the Santa Fe Including the Raton Mountain

estimates include provision for a cooling tower and estimates of operation include allowance for the purchase of water at the rate of 5 cents per thousand gallons. Included in all estimates of construction costs, are amounts to cover contingencies, engineering, and interest during construction.

In each of the direct current systems, the distribution system estimates include two substations located, in so far as possible, at the most economical points. The 1,200 volt direct current distribution system includes the use of an 80 lb. third rail; the 2,400 volt direct current system and the 11,000 volt single phase system include the use of an overhead catenary supported by steel bridges, the trolley contact wire being 22 ft. above the rail.

In the case of the three phase system three substations were included in estimates of the cost of the distributing system and a double overhead catenary supported by steel bridges of the same design as those of the single-phase system and of the 2,400 volt direct current system.

In the case of power purchased from the Trinidad Electric Transmission, Railway & Gas Company the direct current estimates only include one sub-station and the three phase estimates only two sub-stations instead of two and three respectively, this being due to the location of the power company's plant at Trinidad.

In the case of power purchased from the Stag Canon Fuel Company estimates of distributing system costs have included a three phase steel tower transmission line from Dawson to Raton. The single phase system estimates also include a sub-station to convert purchased three phase power at a frequency of 25 cycles to single phase power at 15 cycles.

LOCOMOTIVES AND COST OF OPERATING.

In order to arrive at the most economical size of electric locomotive to be used, time-space diagrams were plotted for each of the seven rated locomotive tonnage capacities, ranging from 300 to 600 tons inclusive, these diagrams being based on average daily train tonnages during the month of May, 1912. After allowing for extra sections such as were recently moved over the mountain at a period of maximum congestion, also for motive power to handle extra freight trains and for equipment under repair, it was concluded that thirteen 115 ton electric locomotives would handle the traffic to best advantage with a minimum outlay of capital.

In view of the fact that no dynamometer records were available except those which were taken when pusher engines were being used, it was found necessary to plot a curve of train resistances estimated in accordance with proper formulæ, in order to obtain an estimate of the amounts of energy required at the drawbar to move one ton of trainload both east and westbound, from which amounts, by the use of proper values of efficiency, total annual tonnage of traffic, etc., and with proper allowances for switching and energy to be supplied to the St. Louis, Rocky Mountain & Pacific, were calculated the estimated power house outputs and amounts of electric energy to be purchased.

In arriving at the expense of enginemen's salaries it was assumed that two locomotives pulling a single train would be operated as a multiple unit with one crew, and that trains requiring three locomotives would require two locomotive crews. It was assumed that electric locomotive crews would be employed at the same wages as those of steam locomotives.

The costs of electric locomotive maintenance and repairs were figured at the rates of 4.06 cents, 4.85 cents and 5 cents per locomotive mile respectively for the direct current, single phase and three phase systems, these amounts representing averages of equipment maintenance records at hand.

In so far as possible the costs of present operation by steam locomotives were taken directly from the records of the railway. However, since the mountain is not a complete engine run, it was found necessary to calculate some of the items, such as the number of steam locomotives properly chargeable to the mountain service, as well as the cost of steam locomotive fuel consumed in the movement of traffic over the mountain. The fuel consumption of the ten helper engines, as well as the investment in these locomotives, are completely chargeable to the mountain service, since the helper service only operates between Trinidad and Raton. Road locomotives, however, operate between La Junta and Raton, and fuel records do not segregate consumption over the mountain from the total consumption over the whole first district of the New Mexico division, and consequently pro-rating of charges was necessary.

COMPARATIVE COST OF OPERATION.

In preparing comparative estimates of steam and electrical operation no interest charges were calculated; instead, the investment in steam locomotives properly chargeable to the mountain section was in each case subtracted from the estimated in-

vestment due to electrification, the difference being termed "new money" and the annual return figured as a percentage of this capital amount.

In order to arrive at proper depreciation charges each class of equipment was assigned a reasonable length of life and depreciation rates were figured for each upon a sinking fund basis and with proper allowance for scrap value. These rates were then applied separately to their respective investments in the various kinds of equipment and total depreciation charges were arrived at by summation.

Other items of expense were conservatively estimated in accordance with available records of electrified trunk lines. The costs of purchased power were calculated for the several systems in accordance with estimated power requirements and with power prices submitted by the power companies.

The following is a statement of the partially estimated costs of steam operation compared with the estimated costs of electrical operation by the use of the single phase system assuming the power house to be constructed and operated by the railway, and the use of coke oven gas as a fuel; electrification with this combination of elements was chosen for the presentation of a detailed statement of comparative expenses, because under this arrangement the greatest return on the investment was indicated.

	Electric. Single phase system	Steam
Investment—		
Power house	$1,099,588	
Distribution system	571,496	
Locomotives	692,000	$380,750
Total	$2,363,084	$380,750
Difference, or "New Money"	$1,982,334	
Annual Costs—		
Operating Expenses—		
Locomotive maintenance and repairs	$22,110	$92,395
Other maintenance and repairs	18,000	
Labor, locomotive operation	27,200	49,377
Other labor	22,000	
Fuel	23,550	69,740
Water	2,175	1,765
Roundhouse expense	8,500	28,109
Locomotive lubricants and supplies	910	3,012
Total operating expenses	$124,445	$244,398
Fixed Charges (exclusive of interest)—		
Taxes	$32,492	$5,235
Insurance	8,861	1,428
Depreciation	86,020	13,707
Total fixed charges	$127,373	$20,370
Grand total	$251,818	$264,768
Difference in favor of electric	$12,950	
Credit for sale of power	50,000	
Total difference in favor of electric	$62,950	
Per cent. return on $1,982,334 of "New Money"	3.18 per cent.	

Electrification estimates of the various systems proposed, together with the several sources of power supply considered, showed the following results as regards investments and returns:

Power Plant Constructed and Operated by Railway Company—		Annual Return or Deficit on "New Money" Invested	
Fuel: Coke Oven Gas—	Total Investment	Amount	Per Cent.
Direct current (1,200 volts)	$2,856,916	$37,114	1.50
Direct current (2,400 volts)	2,510,368	50,174	2.35
Single phase	2,363,084	62,950	3.18
Three phase	2,578,963	31,653	1.44
Fuel: Coal—			
Direct current (1,200 volts)	2,856,916	7,964	0.32
Direct current (2,400 volts)	2,510,368	21,024	0.99
Single phase	2,363,084	32,400	1.63
Three phase	2,578,963	2,347(x)	
Purchased Power—			
From The Trinidad Electric Transmission, Railway & Gas Company—			
Direct current (1,200 volts)	1,768,622	17,917(x)	
Direct current (2,400 volts)	1,403,561	3,951(x)	
Single phase	1,215,362	41,502(x)	
Three phase	1,506,385	62,758(x)	
From The Stag Canon Fuel Company—			
Direct current (1,200 volts)	2,275,935	28,232(x)	
Direct current (2,400 volts)	1,929,387	15,172(x)	
Single phase	1,861,904	22,478(x)	

(x) Deficit.

A graphic cost analysis has been prepared covering both steam and electric operation and indicates that, if the volume of traffic increased about 50 per cent., electrification would offer a sufficient return to pay 5 per cent. interest on the investment. Such a cost analysis is necessarily somewhat approximate, especially in view of the fact that it is quite impossible to predict what additional capacity in generating equipment might be necessary with increase in the volume of traffic, this being due to the lack of any definite basis upon which to predict the increase in maximum simultaneous train movement at periods of congestion. However, it is worthy of mention that the unit costs of electric operation decrease as the volume of traffic increases, whereas the unit costs in the case of steam operation remain comparatively constant.

It is to be noted that the Raton mountain is a short heavy grade line over which not a great many trains are operated daily, due principally to the comparatively recent construction of the Belen cut-off, which offers a lower grade route for transcontinental traffic than does the main line of which the Raton mountain is a part. It seemed, however, to offer possibility of economy from electrification due to the opportunity of selling a considerable amount of power at a better load factor than that of the railway load, and the proposed availability of a very cheap fuel in the form of coke oven gas. However, the mountain is located in a region where coal is cheap; were it somewhat more than 50 per cent. greater in cost, other things being equal, electrification might be done with a return sufficient to pay the interest on the borrowed money. It may safely be said that the principal feature which causes electrification of the Raton mountain to be financially unattractive to the Santa Fe at the present time is the relatively small volume of traffic compared with the tonnage which might need to be handled at periods of congestion. The maximum train movement requirements impose a great burden on the use of electricity in the way of fixed charges which more than overbalance the savings to be realized in locomotive operating expenses. The average load factor of the four proposed electrical systems including commercial power load would amount to only about 15 per cent.

Due to the fact that the mountain is already double tracked, electrification in this case cannot be said to offer a postponement of an investment which might otherwise be immediately necessary. If the line had not been double tracked the writer believes the problem might present a different aspect in view of the fact that traffic capacity could be increased by electrification without the construction of a second track necessitating considerable investment.

It is rather significant that electric motive power cannot be transferred to other parts of a line not electrified, this feature involving a somewhat important disadvantage of the use of electricity on mountain grades. In the case of the Raton mountain the costs of steam operation of the balance of the first district of the New Mexico division (La Junta to Trinidad) might be somewhat increased, due to this feature, by electrification.

The electric locomotive can indeed be said to have distinct physical advantages over steam motive power in the handling of trains on heavy mountain grades, but unless the savings in operation costs are sufficient to equal or exceed the increases in fixed charges brought about by electrification, its use can hardly be said to be warranted unless other conditions, such as the postponement of double tracking, so affect the comparison as to throw the balance in favor of electrical operation. It would seem quite reasonable to believe that, with further development in the art of manufacturing electrical equipment and reduction of its cost, increase in volumes of traffic over mountain grades, and the more extensive development of our water power resources, the electrification of trunk line mountain grades will be brought about to a considerable extent. In general, however, it is believed that longer sections will be included than the one studied in this report.

New York Central Station at Rochester, N. Y.

Construction of New Building and Improved Passenger Facilities for a City of 240,000 Population

The new station of the New York Central & Hudson River, at Rochester, N. Y., which was opened January 19, as mentioned in the news columns of the *Railway Age Gazette*, adjoins and replaces the old station which had been in service about 31⅓ years. This station is used by all through trains on the New York Central main line as well as branch line trains on the Auburn road, the Rochester & Charlotte branch, the Rochester & Niagara Falls branch and the Ontario & St. Lawrence division, and the importance of this business warrants the large investment that has been made. The station is of the through type with 11 station tracks served by 6 platforms in addition to 2 through passenger and 2 freight tracks not adjacent to platforms. Each station track has a capacity of 14 cars. Stub tracks are provided at the ends of each platform for storage. The station platforms are reached from subways under the tracks. In addition to the station building, train platforms and track changes, the work has involved the construction of two new street bridges and the reconstruction of two old ones, the building of a power house, ice house, gas and oil house and service building.

An Exterior View of the New York Central Station at Rochester

The new building is located on a triangular piece of ground between Central avenue, Joseph avenue and the tracks. In order to utilize this property to the best advantage, the main station building, a rectangular structure about 260 ft. by 134 ft. was placed parallel to the street and the express building parallel to the tracks with its east end reaching to Joseph avenue. The entire space between these buildings and the tracks is enclosed and used in the main for the baggage room and passenger concourse.

The main entrance of the station is in the middle of the Central avenue side which is passed by a street car line and can be approached by carriages over a wide driveway. The main exit is at the west end of the concourse connecting to Clinton street, along which a cab stand is provided. Baggage, mail and express will be received and delivered in a large court at the east end between Joseph avenue and the station building.

The building is a steel frame structure carried on concrete piers with spread footings on hard pan that showed a supporting power of 15 tons per sq. ft. under test. The walls are of Medina sandstone up to the second floor level and of a reddish purple brick for the remaining height with Long Meadow sandstone trim. The roof over the waiting room is supported by four pairs of three-hinged steel arch trusses with a span of 90 ft. 8 in. The four-story portions of the structure at each end containing the office floors are severely plain in external treatment, but the waiting room portion which occupies the center of the building relieves this effect by the emphasis of the arch outline in the large windows and the roof. The entire length of this central portion of the building is covered by a heavy marquise above which is set a large clock.

The main waiting room is an unusually large and artistically finished room for a station of this size. It is about 90 ft. by 155 ft. and 54 ft. high, which is larger than the waiting room of the union station in St. Louis and about 70 per cent. as large as that in the new North Western station at Chicago. A broad stairway leads down from the main entrance to the waiting room floor which is 6 ft. below the level of the street in front of the building and about 9½ ft. below the base of rail on the station tracks. The room seats 440 people, the benches being double and enclosing the radiating surface of the heating system. They are surmounted by double bracketed electric reading lamps. The floor is terrazzo, the wainscoting Grueby tile, the walls tapestry brick and the arched ceiling Gustavino tile. By a skillful use of materials harmonizing in colors the room is given a warm, rich appearance without any suggestion of the ornate. The wainscoting is a deep brown with a border of green, blue and yellow. The walls are buff and the ceiling

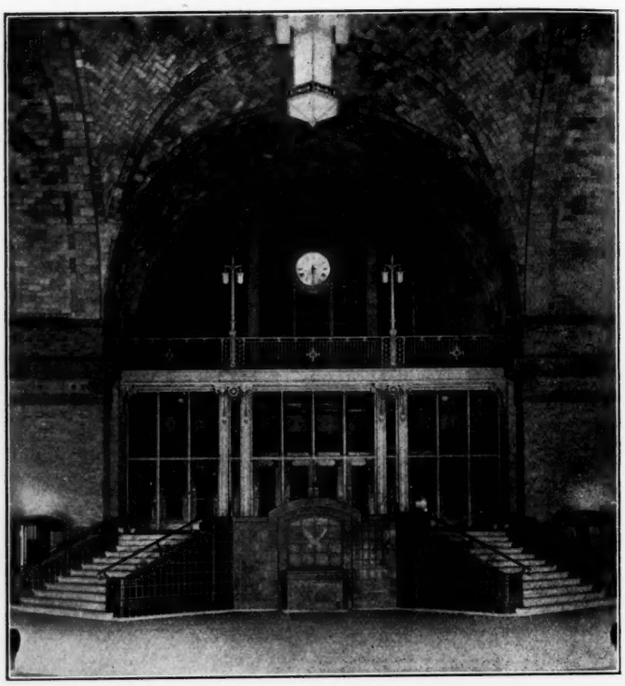
yellow, with traces of pink. Abundant light is secured through three large arched windows on each side and one at each end. In addition to the reading lights, three large bronze electroliers furnish artificial light.

Along the street side of the waiting room on either side of the main entrance are located the information and parcel rooms and the men's pay toilets. Directly across the room from the main entrance is the vestibuled entrance to the concourse. To the east of this entrance is the baggage checking counter which adjoins the baggage room on the rear. On the other side of the concourse entrance are the news stand, telegraph booth and a passageway from the concourse for the use of passengers coming from trains who want to enter the waiting rooms. At the west end of the waiting room are located the lunch room and dining room with the smoking room and men's free toilet in the corner next to the street. A row of telephone booths is placed along the wall between the entrances to the lunch room and dining room. At the opposite end of the waiting room is the ticket office and in the front corner on that end are the women's rooms and toilets. Quarters for a barber shop, the station master, the station police and a branch station of the post office are provided on a mezzanine floor around the waiting room.

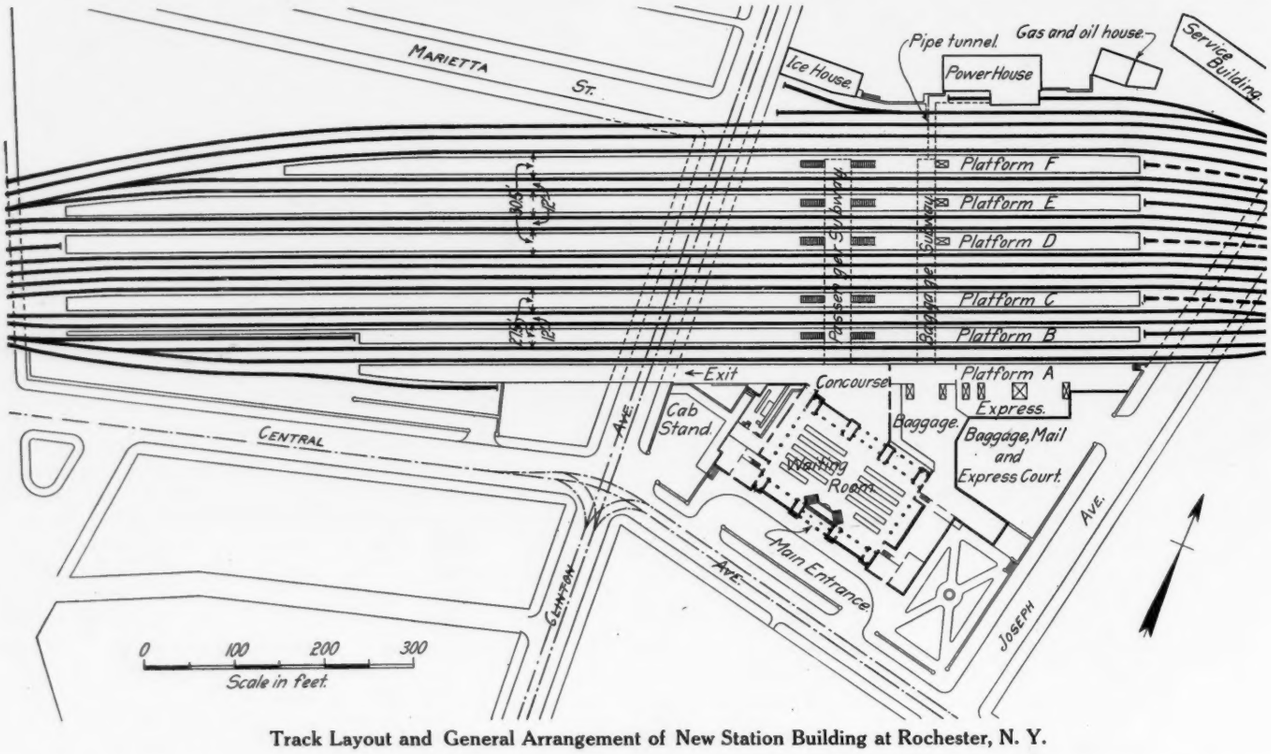
Trains will be announced in the waiting room and passengers held at the entrance to the concourse until the arrival of their trains. Passing through this entrance, they reach the concourse, a triangular room with a flat ceiling of beam and slab construction with skylights in the panels. The walls are faced with cream colored pressed brick, the ceiling is plastered and the cement floor is laid on a slight ramp to connect with the passenger subway under the tracks.

This subway is about 30 ft. wide and 8 ft. high with a row of columns down the center. It is of reinforced concrete construction with cream colored pressed brick facing on the walls and seats along both sides. Stairways lead up in both directions to the five island platforms. These platforms have a maximum length of 1,200 ft. and a maximum width of 20 ft. They are each covered for a portion of their length by steel frame canopies. A special hospital room is provided in the express building which can be reached from the first platform. This room is fitted with hot and cold water and all necessary first aid supplies.

The baggage, mail and express matter is trucked between the respective quarters in the east end of the station and the express building and the three platforms serving westbound trains through a baggage subway under the tracks with elevators to each of these platforms. The three eastbound platforms are reached by trucking across the tracks at grade from the second floor of the express building. The baggage subway is 20 ft. wide and 9 ft. high, of concrete construction throughout.



An Interior Detail of the Main Entrance

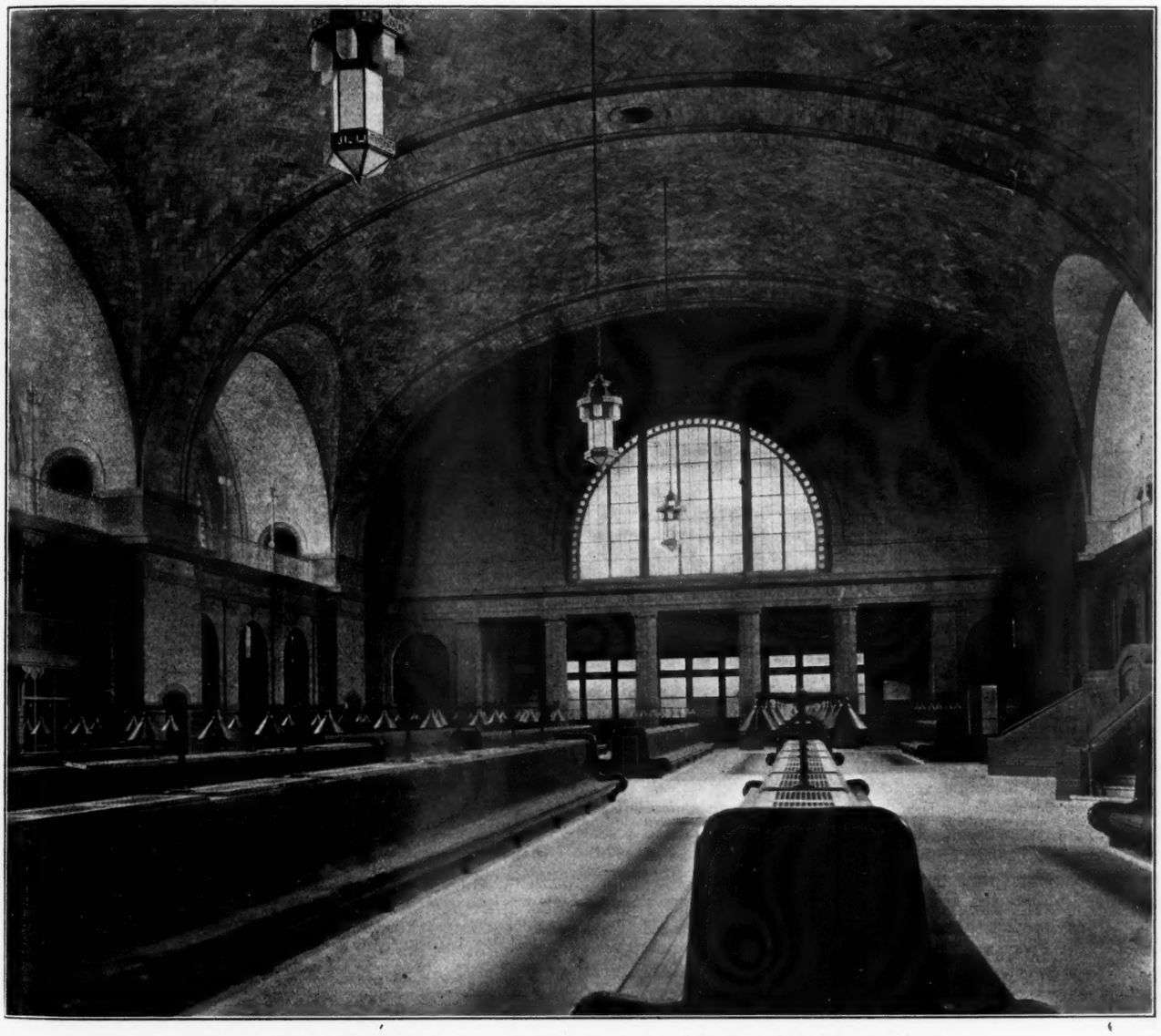


Track Layout and General Arrangement of New Station Building at Rochester, N. Y.

There are three office floors in each end of the main building providing accommodations for all of the company's local offices. These floors can be reached either directly from the street or from either end of the waiting room. The offices are located along the outer face of the building with a corridor through the middle and file rooms adjacent to the light court which separates the upper floors from the ends of the main waiting room. All offices are finished in oak with plaster walls and ceilings.

The power house is located across the track, directly north of the station. It is a brick building about 40 ft. by 110 ft. in size with steel trusses supporting a concrete slab roof. Coal is dumped from an elevated track into storage bins in front of the three 200 h. p. boilers. The ashes are dumped into hoppers under the front of the boilers and then into skips which elevate them to bins over the coal tracks. Provision has been made in the design of the bunkers for the installation of another battery of boilers. The engine room equipment includes two steam turbines to circulate the hot water for the heating system, two pumps for supplying the hydraulic elevators, one pump for domestic water and two for boiler feed water, a six-sweeper steam driven vacuum cleaning plant, a fire pump and a 15-ton Whiting crane.

All pipes are carried from the power house to the station building in a pipe tunnel 7 ft. 6 in. by 8 ft., located under the baggage tunnel, with branches extending under the main building and under the express building. Drinking water which is taken from the city mains is cooled in an icing tank in this tunnel and circulated to fountains in the station. Electric power for lighting and operating the electric elevators and other motor driven apparatus is bought from the local public service company and is distributed from a terminal board in the tunnel. A separate emergency electricity supply is brought in at the west end of the building and a separate conduit carries the telephone and telegraph wires. The clock system of the entire terminal is controlled from a master clock in the despatcher's office. Ventilating fans with a suction system for all toilets are located in the pipe galleries under the station. All sewage is collected to a 4-ft. stone arch sewer carried under the tracks to a connection with the city system.



A General View of the Waiting Room, Which is the Principal Feature of the New Building

The design and construction of this new station was handled under the direction of the engineering department of the New York Central, of which G. W. Kittredge is chief engineer; C. J. Parker, principal assistant engineer; J. W. Pfau, engineer of construction; D. R. Collin, architect; F. E. Paradis, district engineer, and J. B. Reinhardt, resident engineer. The company's architect was assisted by Claude F. Bragdon, Rochester. The general contract was let to Gorsline & Swan Construction Co., Rochester, and work was begun on August 30, 1910.

The Valuation of Railroads*

Commissioner Prouty Discusses Some of the Problems. The Benefits Derived Will Be Important to All Concerned

The commission proceeds under a special act of Congress of March 1, 1913. This act embraces the property of all common carriers subject to the jurisdiction of the commission, but I shall speak of railways alone.

Some few railroads in the United States have adequate maps and plans; many railroads have maps and plans which contain a part of the information required but not the whole; while many others possess nothing of this sort worth naming. So far as these plans already exist, even though not in the most desirable form, they will be used. When this work is completed, there will be found in the office of the commission at Washington an accurate map and inventory of the property of every railroad engaged in interstate business as of June 30, 1914, together with other maps and plans showing all subsequent additions to the property. This of itself is a work of great magnitude which must be done by the carriers. While some expense will be entailed upon our railroads it will be to them well worth the cost.

When the commission has been furnished with this complete inventory by a railroad it must proceed to verify it. It has been decided that this information cannot properly be obtained without sending a surveying party over every mile of the railroad. Sometimes the progress of this party can be comparatively rapid; at other times it will be slow; at all times the work must proceed with sufficient care and detail to make certain that the figures obtained are correct. If this valuation is to serve its purpose it must be so made that it will not be open to just criticism. The general public must feel that the work has been properly and thoroughly done, and that the result is reliable. This would not be if any fact which could be accurately ascertained were guessed at.

It will be necessary to determine the amount of depreciation. This is mainly an engineering task. The time and expense will be considered; indeed, herein arises the major part of the outlay, but no serious difficulties are involved, nor should the result when ascertained be in serious doubt. It should be possible for the people of this country to know upon the completion of this work what it would cost to rebuild its railroads new and to what extent those properties have depreciated as compared to new.

This work is often referred to as a "physical valuation," and most people probably understand that cost of reproduction determines the value of the railway. But this is by no means true. The Supreme Court of the United States holds that cost of reproduction new, or cost of reproduction less depreciation, are only factors entering into the final question of value. Many other things have been enumerated by that court as bearing upon the value of the property. The valuation act itself requires the commission to ascertain and report the cost of construction, the amount of money which has been invested in the property, and the sources from which that money has been derived; to give, in short, a complete corporate and financial history of these properties; to take note of the earnings of the property, and having all these facts before it to determine from a just consideration what is the value of the property itself. I am not saying that it may not finally come to pass that the cost of reproduction will be the controlling factor. I simply call your attention to the fact that in attempting to state the value of the property, many delicate and difficult questions may be encountered.

Take the San Pedro, Los Angeles & Salt Lake, extending from San Pedro, Cal., to Salt Lake City, Utah, 800 miles. Most of this road has been built in comparatively recent times, and the circumstances and cost of construction are fairly well known. Most of the road is in an arid desert. A certain section of it, when built, was located where no man thought it could ever be disturbed by floods, yet shortly after it was opened for operation the floods came and carried out this portion. It was at once reconstructed upon a new location supposed to be beyond all possible danger from a recurrence of the previous disaster; nevertheless, the waters again came and washed away this same section; whereupon it was rebuilt upon a third location, beyond all possible reach of future trouble from this source.

Considering the nature of the road and the people who were interested in its construction, it seems probable that due caution was exercised in the original location; that is, that a reasonably prudent man building this railroad as those men did, to be operated by them as a railroad, would have located it as it was located. It is undoubtedly true that the second location was made with great care, and was believed to be beyond possible danger. It has cost a large sum more to rebuild this road than it would have originally cost to construct it where it is today. Now in determining the value of this property what if any allowance is to be made for this experimental outlay? If the government itself had constructed this railroad it probably would have had the same experience and would have expended the same amount of money which the owners actually did.

This illustration puts the question in a very striking form, but the same idea enters more or less into the valuation of most of the railroads of this country. There has of necessity been a certain amount of experiment before hitting on the right and proper thing. Does this development expense constitute an element of value which may be recognized today, or must the owners of these public utilities stand the loss of their mistakes in the same way that the owner of a private enterprise would? Vast sums of moneys are involved in the answer to that very simple question.

Take another illustration of a different character. The Northern Pacific runs through the city of Spokane. When the road was built that city was of small account, but it has come to be of much account, and in the process of development it has grown up on both sides of this railroad. The Northern Pacific claimed, and it may very well have been true, that the cost of acquiring its right of way through the heart of the city of Spokane at the time of a recent hearing before the commission would be at least five million dollars. The original cost to the railroad was nothing, the right of way having been entirely donated either by the government or by private benefaction. Now to whom belongs this five million dollars? Has the Northern Pacific the right to tax the public for a return upon that amount? Whether it has is a thing of great consequence, for nearly one-fourth of the entire value of the Northern Pacific was the value of its right of way, much of which was due, as in the city of Spokane, to increase in value over its original cost. This question of the unearned increment presents in the valuation of our railways a difficult problem. . . . It is for the commission first of all to ascertain all these facts and from them to deduce what in its opinion is the fair value of these properties. That conclusion may be modified by the courts. In the final analysis it will be for the people to say what measure shall be meted out to these railways. While courts and commissions may influence and even temporarily determine questions of this kind, the will of the masses finally prevails, and it is therefore of first importance that the body of the people should have accurate information.

THE TIME AND EXPENSE

The Valuation Act became a law on March 1, 1913. While the commission was permitted by executive order to employ ten engineers who will have general superintendence of the engi-

*Speech of Hon. C. A. Prouty before the Annual Meeting of the Chamber of Commerce of the United States at Washington, February 11.

neering work, our employees, both engineers and accountants, must be obtained through the Civil Service Commission. . . . Surveys began in all the districts except one about February 1.

A railroad has been selected in each district upon which surveys will proceed with deliberation and in such manner as to afford a kind of instruction school to all employees. This preliminary work will occupy three or four months, which means that we shall not be in position to rapidly develop our organization until about July 1. Beginning then, or slightly before, our force can be rapidly increased.

While it is somewhat hazardous to make an estimate, it is my opinion that the field surveys ought to be concluded in from four to six years. It is hoped that the accounting and other work will keep pace with our field surveys. The putting together of these facts, that is, the actual valuation, will necessarily lag somewhat behind the obtaining of the facts themselves. The commission will in the near future have all the data with respect to some railroads, but whether a valuation will be at once announced in such cases must depend upon the method which the commission selects for determining the various questions which will arise and to which reference has been made.

Any estimate of the expense must be even more unreliable than that of the time. Railroads have been valued both by public authority and by themselves, and the cost of these valuations has run all the way from $2 to $75 per mile. This work must be thoroughly done, and this will require a larger outlay than has usually been made by the states. Moreover the work required by this act is much more comprehensive than has ever been undertaken by any state. I should say, basing my estimate on the experience of state commissions, that fifteen dollars a mile would be sufficient to cover the engineering part of the work, and ten dollars a mile the accounting and other features. This would aggregate for the entire 250,000 miles between six and seven million dollars.

If the experience of railroads be consulted an entirely different conclusion is reached. The cost, as reported to us, of valuations conducted by the carriers themselves runs from forty to eighty dollars a mile. It is true that in this work by the railways certain things are included which will not be done by the commission, but to offset this most carriers have ascertained simply the cost of reproduction, with no reference to depreciation, and with but little accounting work. If our information is correct and if the government cannot do this work cheaper than the railroads themselves, it will cost at least fifty dollars a mile to complete the work. I told the Appropriations Committee of the House last July that from what I knew about the subject then I should not advise Congress to enter upon this undertaking unless it was ready to expend at least twelve millions, and another six months' reflection has not changed that opinion.

While, however, this is a large sum, and much more than Congress contemplated when the act itself was passed, it is the merest trifle compared to the enormous values involved. The capitalization of our railroads at the present time aggregates nearly twenty billions of dollars. It has been recently estimated that these securities at their present market value are worth from fourteen to fifteen billions. The cost of this work, therefore, cannot exceed from one-tenth to one-twentieth of 1 per cent. of the value ascertained, a sum utterly insignificant in proportion to the magnitude of the thing dealt with.

Look at this from another standpoint. One purpose—to some minds the principal purpose—of this valuation is to determine the amount upon which the public should be required to pay a return to the owners of these public utilities. Assume that this valuation varies the amount upon which such return should be paid by only 5 per cent. Five per cent. of twenty billions is one billion, and a return of 6 per cent. upon one billion is sixty millions annually. The difference to either the public or the railroad may therefore well be, for every year, five times the entire cost of the valuation itself. Certainly the expense should not deter the people from demanding the prosecution and completion of this undertaking in a thorough and competent fashion.

THE BENEFIT

What, finally, is the purpose of and the benefit to be derived from all this outlay of money and of energy? There are many advantages, some of which I shall refer to without thereby intending to minimize the others. And first let me call your attention to the incidental benefit to the investing public.

Many persons seem to hold the opinion that the government in dealing with monopolies like the railroad owes nothing to the investing public. *Caveat emptor*—let the buyer take care of himself—such has never been my own thought. The investor is a necessary part of the well-balanced state, and is often in need of protection from public authority. It is the duty of the government within reasonable limits to see to it that the would-be investor is not hoodwinked in the making of his investment and that the value of his investment, when once made, is not improperly destroyed.

In railway investment the public has a more immediate interest. Just in proportion as railway securities commend themselves to the investing public it is possible for the railway to obtain the money with which to make necessary improvements to its property. Whatever benefits the credit of our railways; whatever gives to railway securities the investment quality with bank stocks and municipal bonds; whatever, in a word, takes from railroad stocks the speculative and uncertain element, indirectly reduces the cost of furnishing railway service and thereby inures to the benefit of the general public.

Now when any investor can know from reliable sources the exact character of his investment; how much it would cost to reproduce the property; in what state of efficiency that property is being maintained; above all, what is the value of that property for use as a railroad, there has been injected into railroad securities an element of certainty and of permanency which does not now exist. It seems to me, therefore, that this work of valuation will be of incidental benefit to the railway investor and so to the general public. While this has not been generally, perhaps not at all, remarked upon as an advantage, it will turn out to be a substantial one.

To the general apprehension the object of this valuation is to determine what rates our railways should be allowed to charge for their services to the public.

While the property invested in our railroads and other public utilities is private property, the government has, in consideration of the nature of the service rendered, the right to impose upon this property the terms and conditions under which it shall be used. It may, in the case of a railroad, determine the character of its equipment, the schedules upon which its trains shall run, and in general may control the operation of the property in so far as the public has an interest therein. It may fix the rates to be charged by that railroad for the transportation of persons and of property and for any other service which it renders to the public. To this power of the government over such private property there is this important qualification: Under the Constitution of the United States, as interpreted by the Supreme Court of the United States, such property must be allowed a fair return upon the fair value of the investment.

What is a fair rate of return depends, probably, to some extent upon the character of the property and its location. The relative functions of the legislative and judicial branches in the fixing of that rate are not yet clearly defined. All just men concede that it should be substantially the same as the return obtainable from private investment having the same incidents. Manifestly it is not a difficult thing to determine the rate of return to which this property is entitled. There still remains, however, the value upon which this rate is to be computed, and until that value is known it is impossible to determine what total income the property is entitled to earn and, therefore, to fix the charge which may be justly made against the public.

The rates of public utilities are at the present day usually fixed by commissions, both state and federal. It is perhaps the natural inference that when the value of the property has been determined and the rate of return fixed, the work of the com-

mission in establishing the charge of the public utility is comparatively easy. It is only necessary to multiply the value by the rate and to allow a charge which will yield that income.

And this, with some important qualifications, is true as to certain kinds of public utilities. Take, for instance, a water plant or a gas plant. This serves a single community. As a rule it meets no competition in that service. The amount of its business is known or can be forecast with reasonable accuracy. Even matters of depreciation and such like have come to be pretty accurately understood. It is possible, therefore, to fix with some confidence the rates of such a utility when the value of the investment is known.

With the railroad, however, this is entirely different for the reason that it seldom happens that a single railroad can be considered by itself. The greater part of the business of the railways of the United States is subject to competitive conditions of one sort and another which are largely controlling so that the rates of one are necessarily bound up with those of another. A moment's thought will show the extent to which this is true.

Nearly every station at which considerable quantities of traffic originate or are delivered is served by more than one railroad. It is possible, for example, under present switching absorption tariffs in force at the city of Chicago to reach any point within the switching limits of that city at the same rate by any line which reaches the city. The same is in substance true of the city of New York and the great industrial district of which New York is the center. It is also true that while two given points may each be served by but two railways, a great variety of routes between those points can be found by choosing different intermediate carriers. For example, lumber from almost any point of production in the South can reach Chicago by a variety of routes through the various Ohio river gateways. Now while it may occasionally happen that the rate by one route is different from that of another, broadly speaking the rate by competing rail lines is the same.

Nor is direct competition of this kind the only competitive force of controlling influence. An examination of conditions in almost any agricultural state like Iowa, for example, will show that the farm upon which the corn or the wheat is grown lies midway between two lines of railroad, so that the product of the same can be sent to market by two, and often by three, different carriers. Manifestly the rate made by each of these carriers for the transportation of this farm produce must be substantially the same. . . . A coal mine may be served by a single carrier, but that carrier cannot therefore impose whatever rate it sees fit upon the product of that mine, for, unless the charge to the point of consumption is as favorable as that from some competing mine by some other carrier, the mine itself cannot do business and the railway loses the traffic. This sort of competition is of universal application and of tremendous influence. . . . It is impossible to shake a single railroad free from every other and fix its charges upon the basis of a fair return upon its fair value as you would in case of a gas or water plant. Now it is evident that if the commission should select that road most advantageously situated, that road whose business is the largest and upon which the conditions of operation are the most favorable, and should so adjust its rates as to yield a return of 6 per cent. upon its value, every other railroad standing in competition with it would receive less than a 6 per cent. return, anl some railroads might receive nothing whatever; while if that road laboring under the greatest disadvantage were to be selected and such rates established as would permit it to make a return of 6 per cent. upon its investment, its competitors would one and all be receiving an undue return.

A certain amount of traffic is strictly non-competitive. What proportion this may bear to the whole I have no idea; the per cent. would be small. Theoretically it might be possible for railroads to take up the slack, so to speak, between what would be a fair rate for one and that for another by an adjustment of rates upon this local business. In the Minnesota Rate Case and cognate cases, recently decided by the Supreme Court, it was held that while the principal railroad systems involved had not established confiscation and must therefore submit to the rates prescribed, certain roads of minor importance had made out their case. These lines, in so far as they could, were allowed to charge higher local rates than the others.

The effect of this would be to establish extremely high local charges upon certain lines and extremely low local charges upon others. Upon main lines and upon lines of dense traffic, rates would be low; upon branch lines and those with less traffic, charges would be high. The general effect would be to concentrate business into certain localities, whereas it has always seemed to me that the aim should be to so adjust transportation charges as to secure a general diffusion of values and of business. If this government operated its railways rates would be generally the same upon all lines in given sections.

While, however, I wish to make it perfectly plain that the problem of establishing railway rates will not be solved by this valuation, I desire to say with even greater emphasis that that problem will be enormously simplified. It can be known with certainty whether the general level of rates is or is not too high, and in establishing the charges to be observed by a single carrier, even in fixing the rate upon a single commodity, it will be of much benefit to know the value of the property involved. Every railroad commissioner will join with me in saying that here is the only solid foundation upon which he can stand; that the determination of these values is indispensable to the just and intelligent administration of his work.

While this valuation will be of incidental benefit to the investor, while it is essential to the work of the rate-making tribunal, it seems to me that its greatest immediate value is political. The state of the public mind towards our railways is such that this information is absolutely necessary.

Some years ago the commission had occasion to examine the reasonableness of rates to points upon the Pecos Valley Line of the Santa Fe System. The railroad under consideration runs from Amarillo, Tex., into and through what was then the Territory of New Mexico. That part of the line in Texas had been constructed under a Texas charter, and therefore in conformity with the Texas stock-and-bond law under which the capitalization could not exceed the investment in the property. The railroad in New Mexico had been built under a charter from that territory without any limitation upon the amount of securities which could be issued. The cost of the road was substantially the same in Texas and New Mexico—perhaps slightly greater in New Mexico. The capitalization of the Texas company was $8,000 per mile; that of the New Mexico company $42,000 per mile. This is a somewhat striking instance of what has happened at certain times in certain parts of this country in the building and capitalizing of our railroads. From what is known of such operations there has come to be a deep-seated conviction in the minds of many people that our railroads as a whole are enormously over-capitalized and that the public is paying interest and dividends upon securities which represent no actual value.

Upon the other hand, it appeared in the Eastern Rate Advance Case, decided in 1910, that the Pennsylvania Railroad had in the ten years preceding that investigation put into its properties east of Pittsburgh more than two hundred million dollars from earnings, which, therefore, was not represented in the capital account of that company. It is well known that many other railroads have improved their property out of earnings without any corresponding increase in their capital accounts. This leads many to the conviction that while individual railroads may be overcapitalized our railroads as a whole are worth more than their stocks and bonds.

Consider the developments of the investigation into the affairs of the St. Louis & San Francisco System, conducted by the Interstate Commerce Commission. Consider conditions in New England today, where the fate both of the Boston & Maine and the New Haven systems is trembling in the balance. None of these questions can be answered; none of these situations can be justly dealt with until we know the actual value of these prop-

erties. This is the question which arises before the student of this railway problem at every angle. This is the question which must be answered before this problem can be intelligently discussed. For this reason, above all, it is important that this work should be pressed to a completion in the most expeditious and the most trustworthy manner possible.

BRAKE EFFICIENCY TESTS ON STEEL AND IRON WHEELS*

By F. K. Vial

Chief Engineer, Griffin Wheel Company, Chicago, Ill.

The coefficient of friction between the brake shoe and the moving wheel, which is the measure of brake efficiency, is a variable quantity depending on the speed and kind of wheel, the shoe pressure, the length of time the shoe is applied; the kind of shoe, whether plain, chilled or with inserts; the kind and shape of the inserts; the condition of the shoe, etc. The coefficients of friction for a large variety of brake shoes under varying conditions have been determined at Purdue University in a series of tests conducted for the M. C. B. Association and reported in the M. C. B. Proceedings for the year 1910-1911. Supplementary tests were also made for the Association of Manufacturers of Chilled Car Wheels.

For the original test, 14 pairs of brake shoes were selected, as indicated in Table I. One set of 14 shoes was tested at the laboratory of Purdue University, and the other set was tested on the brake shoe testing machine of the American Brake Shoe & Foundry Company at Mahwah, N. J. The coefficients of friction were determined on a chilled iron wheel in effecting stops from an initial speed of 40 m. p. h. under three brake shoe pressures, viz., 2,808, 4,152 and 6,840 lb. On the steel wheel the coefficients of friction were determined at pressures of 2,808, 4,152, 6,840, 10,000, 12,000, 15,000 and 18,000 lb., effecting stops from an initial speed of 65 m. p. h. The results are shown in Table I.

The tests made at Purdue University, and reported in the M. C. B. Proceedings of 1911, were conducted on seven shoes effecting stops from 80 m. p. h. at pressures of 12,000, 14,000 16,000, 18,000 and 20,000 lb., as shown in Table 2.

Table 2.—Purdue Tests for M. C. B. Association*

Coefficients of friction with a steel tired wheel—Initial speed 80 m. p. h.

Kind of Shoe	Shoe pressures in pounds 12,000	14,000	16,000	18,000	20,000
Congdon	9.60	9.08	8.68	8.57	7.25
Plain cast iron	8.22	9.22	9.19	8.70	7.21
Spear-Miller	9.98	9.47	8.42	7.67	8.30
National	8.73	8.99	8.67	7.68	6.87
Diamond S	9.72	9.55	8.73	8.86	7.02
U shoe	9.60	9.27	8.72	8.45	7.34
Pittsburgh	19.75	18.75	17.75	17.10	15.27

*Proceedings M. C. B. Association 1911.

A series of tests were also conducted for the Association of Manufacturers of Chilled Car Wheels at Purdue University, with brake shoes acting on both the chilled iron and steel wheel tested under pressures of 2,808, 4,152, 6,840 and 12,000 lb., from an initial speed of 40 m. p. h. The results of these tests are given in Table 3.

Table 3.—Purdue Tests for Association of Manufacturers of Chilled Car Wheels

Coefficients of friction from initial speed of 40 m. p. h.

Kind of Brake Shoe	Chilled iron Pressures 2,808	4,152	6,840	12,000	Rolled steel wheels Pressures 2,808	4,152	6,840	12,000
Streeter	24.7	20.8	17.6	13.8	21.4	18.7	14.7	12.8
Lappin chill. ends.	18.5	16.5	14.8	13.6	18.5	16.2	13.2	11.4
Diamond S	22.5	20.0	18.4	14.8	19.8	16.5	14.0	11.7
V inserts, chilled inserts	17.4	17.0	11.8	10.9	19.3	16.9	13.9	12.8
Average	20.8	18.6	15.6	13.3	19.8	17.1	13.9	12.2

A review of the foregoing tests will show that a greater coefficient of friction is obtained with the chilled iron wheel. The number of brake shoes used in the various tests are different, therefore the averages are not exactly on the same basis. The results from the Diamond S shoe throughout seem to be very consistent. The tests made by Purdue University in 1910 show the Diamond S coefficients at the different pressures to be almost exactly equal to the average of all the shoes tested. Again in 1913, the shoes tested for the Association of Manufacturers of Chilled Car Wheels give the identical coefficients for the Diamond S shoe, and for that reason we know that the tests are comparative, although they were not all made at the same time. The results with this type of brake shoe are shown in Fig. 1. From this diagram, and from the review of the tables in general, the indications are very evident that there is a dropping off in the coefficient of friction in brake shoes as the pressure increases. The rate of decrease amounts to about 6 per cent. of the coefficient of friction for each increase of 1,000 lb. pressure.

Table I.—Brake Shoe Friction Tests*

Test laboratory	Type of Brake Shoe	†Chilled iron wheel. Shoe pressure in pounds 2,808	4,152	6,840	Mean coefficient of friction in per cent.—Initial speed of 65 m. p. h. steel tired wheel. Shoe pressure in pounds 2,808	4,152	6,840	10,000	12,000	15,000	18,000
A. B. S. & F. Co.	Plain cast iron—(C. & N. W.)	26.3	21.7	21.0	16.3	13.1	11.0	...	...	...	...
Purdue	Plain cast iron—(C. & N. W.)	22.1	21.6	20.4	16.0	...	12.4	...	10.4	...	...
A. B. S. & F. Co.	Plain cast iron—(without re-inf.)	25.1	23.5	20.6	...	...	11.7	...	...	...	...
Purdue	Plain cast iron—(without re-inf.)	30.3	27.7	24.5	16.3	...	13.5	...	11.6	...	...
A. B. S. & F. Co.	Congdon—7 wrought ins'ts (C. & N. W.)	26.8	19.0	15.3	19.7	17.7	12.4	8.9	9.4	8.2	7.7
Purdue	Congdon—7 wrought ins'ts (C. & N. W.)	22.2	19.8	16.4	20.6	...	14.0	...	11.3	...	...
A. B. S. & F. Co.	Congdon—5 wrought ins'ts (A. B. S. & F.)	25.0	18.3	17.2	20.3	18.0	11.8	9.5	9.8	8.5	7.6
Purdue	Congdon—5 wrought ins'ts (A. B. S. & F.)	24.4	22.6	19.1	15.1	...	11.9	...	11.7	...	...
A. B. S. & F. Co.	Streeter—2 hard iron ins'ts (A. B. S. & F.)	24.5	22.6	19.0	16.9	14.9	11.2	11.7	10.4	9.5	9.1
Purdue	Streeter—2 hard iron ins'ts (A. B. S. & F.)	21.3	20.6	16.4	13.6	...	10.8	...	10.7	...	...
A. B. S. & F. Co.	Lappin—chilled ends (A. B. S. & F.)	18.2	16.8	16.1	15.0	13.4	10.1	8.8	8.6	8.8	6.8
Purdue	Lappin—chilled ends (A. B. S. & F.)	20.5	19.6	18.9	17.0	...	13.0	...	11.1	...	...
A. B. S. & F. Co.	Lappin—chilled ends (A. B. S. & F.)	20.5	18.4	14.3	16.3	15.1	11.6	9.1	9.3	7.9	6.6
Purdue	Lappin—chilled ends (A. B. S. & F.)	18.4	17.8	17.5	16.9	...	12.7	...	12.2	...	...
A. B. S. & F. Co.	Plain cast iron (A. B. S. & F.)	27.0	25.1	21.9	16.8	13.5	11.3	9.7	8.4	9.3	8.5
Purdue	Plain cast iron (A. B. S. & F.)	21.0	20.3	18.5	16.2	...	13.2	...	11.1	...	...
A. B. S. & F. Co.	Plain cast iron (Columbia B. S. Co.)	27.0	28.6	21.8	18.3	14.0	13.5	15.3	...	...	...
Purdue	Plain cast iron (Columbia B. S. Co.)	21.0	18.9	17.3	16.8	...	13.1	...	10.7	...	...
A. B. S. & F. Co.	Diamond S—chilled ends (A. B. S. & F.)	24.2	20.0	16.2	21.5	17.4	13.5	11.2	10.8	9.8	9.8
Purdue	Diamond S—chilled ends (A. B. S. & F.)	22.8	20.5	18.3	17.3	...	13.6	...	12.3	...	...
A. B. S. & F. Co.	Walsh—2 hard iron ins'ts (W. B. S. Co.)	22.6	20.0	14.9	14.7	12.1	10.3	8.7	8.6	9.1	8.7
Purdue	Walsh—2 hard iron ins'ts (W. B. S. Co.)	23.7	20.5	19.8	16.6	...	14.4	...	11.5	...	...
A. B. S. & F. Co.	Pittsburgh malleable iron shell	24.4	21.9	17.0	17.7	17.9	17.5	14.0	11.8	11.2	10.7
Purdue	Pittsburgh malleable iron shell	26.8	25.4	21.5	22.8	...	18.9	...	17.6	...	...
A. B. S. & F. Co.	Pittsburgh steel shell (P. B. S. Co.)	29.9	29.6	24.2	23.0	20.9	18.7	15.8	14.7	14.2	15.3
Purdue	Pittsburgh steel shell (P. B. S. Co.)	29.4	27.5	23.4	25.8	...	23.2	...	22.2	...	...
A. B. S. & F. Co.	National—chilled ends (N. B. S. Co.)	16.3	15.2	11.9	15.1	11.3	9.8	8.2	7.5	6.9	8.3
Purdue	National—chilled ends (N. B. S. Co.)	19.3	16.4	14.3	15.2	...	12.1	...	11.2	...	...

*Taken from the 1910 M. C. B. Proceedings. †Mean coefficient of friction in per cent.—Initial speed of 40 m. p. h.

*This review was prepared for the Association of Manufacturers of Chilled Car Wheels, the data being obtained from a series of tests made for them at Purdue University during 1913.

This 6 per cent. drop is constant within the limits of these tests and holds true for both the chilled iron and steel wheels. This may be illustrated by the following data from the tests conducted by Purdue University for the Association of Manufacturers of Chilled Car Wheels:

	Chilled iron wheels		Steel wheels	
Pressure-pounds	Efficiency	Calculated Efficiency	Efficiency	Calculated Efficiency
3,000	22.	...	19.3	...
4,000	20.7	20.7	17.1	18.1
5,000	19.4	19.5	15.6	16.
6,000	18.4	18.3	14.5	14.6
7,000	17.6	17.3	13.7	13.6
8,000	16.9	16.6	13.1	12.8
9,000	16.3	15.9	12.6	12.3
10,000	15.8	15.4	12.2	11.8
11,000	15.3	14.9	11.9	11.4
12,000	14.8	14.4	11.7	11.1

While there are some departures from this 6 per cent. reduction per 1,000 lb. addition to shoe pressure, these variations are compensating. In general the calculated values follow the observed values very closely

It is also evident that there is a dropping off in the coefficient of friction as the velocity of the rotating wheel increases. It is, therefore, self evident that the retarding force is not proportional to the braking power or shoe pressure, but in general terms, for pressures between 2,000 and 15,000 lb. per shoe, the amount of work accomplished increases with but half the rapidity that the shoe pressure increases, that is to say, doubling the shoe pressure will increase the retarding effect 50 per cent. This is shown graphically in Fig. 2. At very low and very high

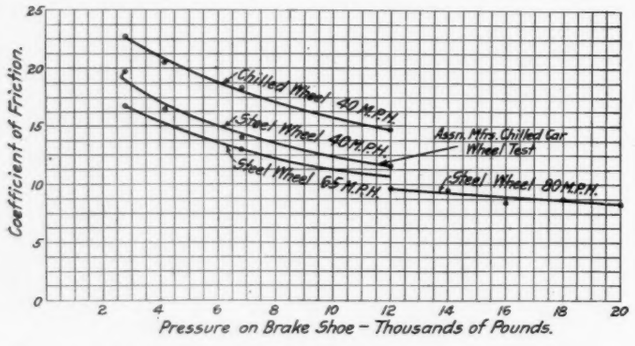

Coefficient of Friction.
Chilled Wheel 40 M.P.H.
Steel Wheel 40 M.P.H.
Assn. Mfrs. Chilled Car Wheel Test
Steel Wheel 65 M.P.H.
Steel Wheel 80 M.P.H.
Pressure on Brake Shoe - Thousands of Pounds.

Fig. 1—Coefficient of Friction for Diamond S Brake Shoe in Stops from Various Initial Speeds

pressures the work accomplished increases in a very much lower ratio. In the case of the Diamond S shoe on the chilled iron wheel, at a constant speed of 20 m. p. h., the coefficient of friction at 800 lb. pressure was 44 per cent., and at 2,000 lb. pressure, 26.3 per cent. This is shown graphically in Fig. 3. The retarding force at 800 lb. was 352 lb., while at 2,000 lb. pressure, the retarding force was 526 lb. This shows that for an increase in shoe pressure of 150 per cent., the work done increased but 50 per cent. This shows the great advantage of the small continuous pressure as compared with heavy intermittent pressure in controlling trains on heavy grades.

At very high pressures, Dean Benjamin of Purdue University states, in his report of May 10, 1911, to the chairman of the Brake Shoe Committee of the M. C. B. Association: "It is easily seen that the coefficients of friction drop rapidly between 18,000 and 20,000 lb. pressure, and that the amount of wear is correspondingly great while the stopping distance, of course, is not materially diminished."

RELATION OF SPEED TO COEFFICIENT OF FRICTION

On account of the majority of tests on the steel wheel having been made at high speeds and those on the chilled iron wheel at 40 m. p. h. and less, a direct comparison of the effect of speed on the coefficient of friction is not as clearly worked out as would be desirable. However, there is sufficient data to indicate the probable effect through a range of from 40 to 80 m. p. h. This is brought out in Fig. 1. Under heavier pressures the effect of speed is not as noticeable as at lower pressures. The probability is that after reaching 12,000 lb. pressure the speed effect is very largely eliminated, whereas at the lower pressures the effect of increasing speeds is a very material reduction in the coefficient of friction. There are two tests on steel wheels that may be compared. One of these was made with an initial speed of 40 m. p. h., the second with an

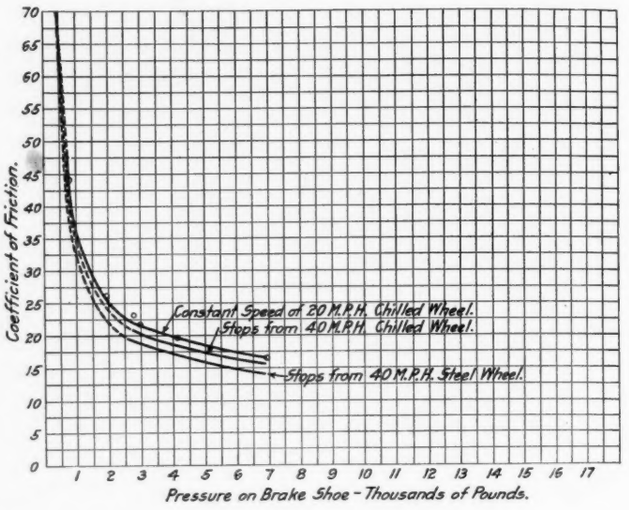

Coefficient of Friction.
Constant Speed at 20 M.P.H. Chilled Wheel.
Stops from 40 M.P.H. Chilled Wheel.
Stops from 40 M.P.H. Steel Wheel.
Pressure on Brake Shoe - Thousands of Pounds.

Fig. 2—Comparison of Coefficients of Friction in Stops from Initial Speed of 40 Miles per Hour and Uniform Speed of 20 Miles per Hour

initial speed of 65 m. p. h. From these tests it has been found that there is a drop of 10 per cent. in brake efficiency in passing from 40 to 65 m. p. h. with steel wheels. There is no data at hand to show just what the variation is in the case of chilled wheels, but it is very probable that the loss in efficiency at higher speeds is very similar to that of steel wheels under like conditions.

BRAKE EFFICIENCY—CHILLED IRON VS. STEEL WHEELS

The question is often raised as to whether the brake efficiency of chilled iron wheels is equal to that of steel wheels. The in-

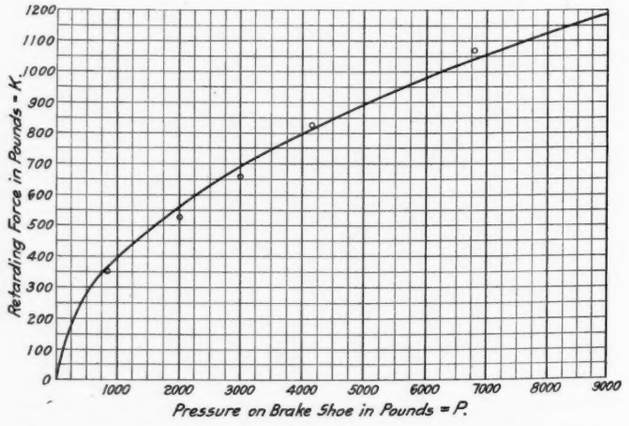


Fig. 3—Relation of Retarding Force to Pressure on Brake Shoe at 20 Miles per Hour

dication is very strong in all the foregoing tests that not only is the brake efficiency of the chilled iron wheel equal to that of the steel wheel, but as a matter of fact, it is about 25 per cent. higher. This is shown in comparing the tests made for the Association of Manufacturers of Chilled Car Wheels with the tests made for the M. C. B. Association, stops being made

from an initial speed of 40 m. p. h. According to Fig. 1 the coefficients of friction are easily 25 per cent. in favor of the chilled iron wheel in stops made from an initial speed of 40 m. p. h. That the coefficient of friction between the brake shoe and the chilled iron wheel is materially greater than on the steel wheel, all conditions being equal, is clearly indicated in the M. C. B. Association specifications which state as follows:

	Coeff. of Friction Per cent.
First: Tests upon chilled iron wheel from an initial speed of 40 m. p. h.—	
at 2,808 lb. pressure	22
at 4,152 lb. pressure	20
at 6,840 lb. pressure	16
Second: Tests upon steel wheel from an initial speed of 65 m. p. h.—	
at 2,808 lb. pressure	16
at 4,152 lb. pressure	14
at 6,840 lb. pressure	12

Although the specifications required that the speed of the steel wheel be 65 m. p. h., and the chilled iron wheel 40 m. p. h., it does not seem that the difference on account of the speed element can amount to more than 10 per cent. Therefore, reducing the specifications for coefficients of friction on the steel wheel to 40 m. p. h. by the use of this factor, we have the following comparison of coefficients of friction on brake shoes for stops from an initial speed of 40 m. p. h. on both the chilled iron and steel wheel:

COEFFICIENT OF FRICTION

Pressure lb.	Chilled iron Per cent.	Steel wheel Per cent.	Difference	Per cent. in favor of chilled iron
2,808	22	17.6	4.4	25.
4,152	20	15.4	4.6	29.8
6,840	16	13.2	2.8	21.2

This indicates that the M. C. B. Association, in their specifications, demand 25 per cent. greater efficiency in brake shoes when applied to chilled iron wheels than when applied to steel wheels. Applying these specifications to the tests made at Purdue University for the Association of Manufacturers of Chilled Car Wheels, we note that only two of the shoes fully met the specifications. These were the Streeter and Diamond S, which showed the following percentages in favor of the chilled iron wheel:

Streeter shoe:

At 2,808 lb. pres. retard. force 15.4 per cent. greater in chilled iron wheel
At 4,152 lb. pres. retard. force 11.2 per cent. greater in chilled iron wheel
At 6,840 lb. pres. retard. force 19.7 per cent. greater in chilled iron wheel
At 12,000 lb. pres. retard. force 7.8 per cent. greater in chilled iron wheel

Diamond S shoe:

At 2,808 lb. pres. retard. force 13.6 per cent. greater in chilled iron wheel
At 4,152 lb. pres. retard. force 21.2 per cent. greater in chilled iron wheel
At 6,840 lb. pres. retard. force 31.4 per cent. greater in chilled iron wheel
At 12,000 lb. pres. retard. force 26.5 per cent. greater in chilled iron wheel

In the report of Purdue University, signed by Lewis E. Endsley, addressed to the chairman of the M. C. B. Committee on Brake Shoe Tests, dated February 21, 1910, is found the following note concerning the tests:

"None of the 14 shoes tested damaged the surface of the cast iron wheel during the wearing test. In the wearing test on the steel tired wheel at a constant speed of 30 m. p. h. and at a pressure of 2,808 lb., two shoes scored the wheel.

"Shoe No. 286, which was given 300 applications, cut four V shaped grooves about 1/32 in. deep and several smaller ones in the surface of the wheel around the entire circumference. After test of this shoe, the wheel had to be ground with a revolving emery wheel in order to get a smooth surface for the next shoe.

"The other shoe that scored the steel tired wheel was No. 288. This shoe was given only 100 applications for in that time it had cut five grooves similar to those cut by shoe No. 286."

The above shows that insert shoes cannot be used on steel wheels on account of the severe scoring and wearing away of the steel, whereas no such effect is found on the chilled iron wheel; and it will be found that the shoes with the steel inserts, which do the most damage to the steel wheels and, therefore, cannot be used, are the ones which give the high coefficient of friction and should be eliminated from consideration in making comparisons of laboratory tests. The final conclusion from all tests made at Purdue University is that the coefficient of brake shoe friction on chilled iron wheels is fully 25 per cent. greater than on the steel wheels when working under ordinary conditions.

THE COLEMAN CUT-OFF

BY J. B. SKEEN

Assistant Engineer, Atchison, Topeka & Santa Fe, Los Angeles, Cal.

The Atchison, Topeka & Santa Fe is now completing the construction of a new line between Lubbock, Tex., and Texico, N. Mex., which is the connecting link between the Gulf lines and the Coast lines of the Santa Fe system and which will form a direct route from the Gulf of Mexico to the Pacific coast. Not only does this line shorten the distance via the Santa Fe between the above points several hundred miles, but it opens up for development a large fertile area previously without railroad facilities.

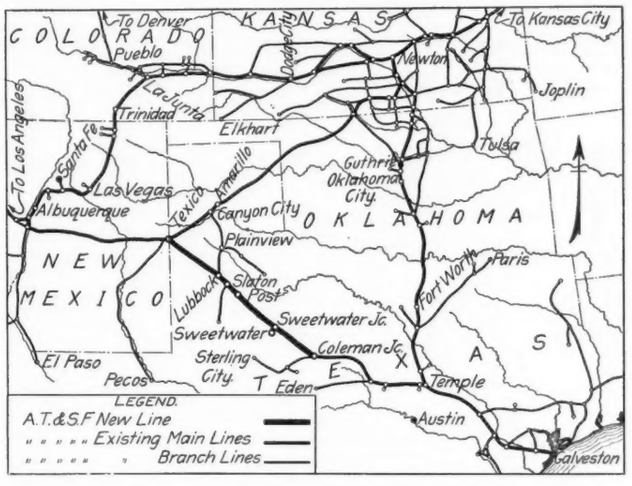


Fig. 1—Map of a Portion of Santa Fe Lines Showing Relation of Coleman-Texico Line to Rest of System

At the time the construction of this line was started, work was also begun on an extension from Plainview to Lubbock, being a continuation of the branch line built from Canyon City to Plainview in 1906 and providing a connection with the main line recently constructed from Newton, Kan., to Texico, N. Mex., over which a large portion of the business to and from

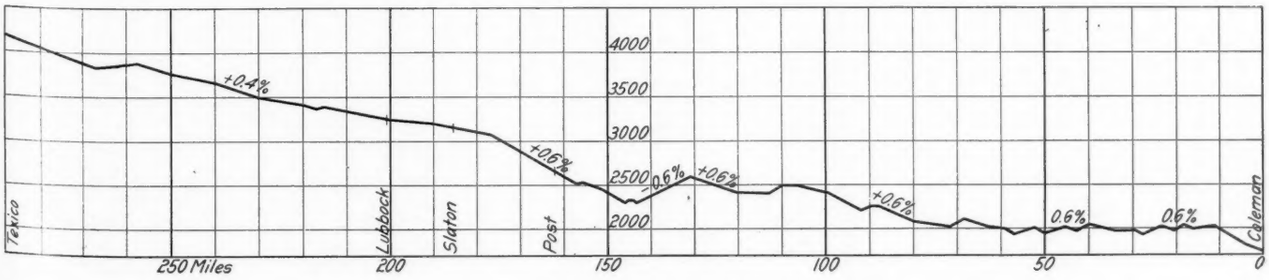


Fig. 2—Profile of New Line From Coleman to Texico

the Coast lines has been handled since the completion of the Belen cut-off in 1906. At the time the Plainview-Lubbock line was completed, work was also well under way on a new line from Lubbock southeast to Coleman, Tex., so that the recent development of the Santa Fe lines in west Texas comprises a new line from Coleman to Texico and to Plainview. This development represents the expenditure of approximately $8,000,000, exclusive of equipment.

These lines have been built to high standards of construction. When that portion of the line between Coleman and Lubbock was turned over to the operating department in December, 1912, the engineer of the Texas Railroad Commission stated that it was the best piece of railroad work ever undertaken in the state. The maximum grade in both directions was 0.6 per cent. and the maximum degree of curve 4 degs., all curves of 2 degs. and over being spiraled.

Some rather heavy grading was necessary at certain places,

Fig. 3—Typical Grading Work in Ascending onto Plains Near Post City

especially in going from the lower country up onto the plains west of Post, the deepest cut in this vicinity being about 80 ft., and the heaviest fill of the same height. The yardage moved between Coleman and Texico was 5,511,887 cu. yds. of earth embankment; 1,775,974 yds. of earth excavation; 657,822 yds. of loose rock and 1,124,784 yds. of solid rock. Embankments were originally constructed with an 18 ft. crown but they were later widened to 20 ft. to support the ballast. Cuts were made 28 ft. wide.

Waterway openings consist for the most part of steel girders on concrete masonry, concrete arches, cast iron pipe with concrete headwalls, and creosoted ballasted deck pile trestles. As far as possible these structures were built in advance of track

Fig. 4—Typical Fill in Vicinity of Post City

laying so as to allow that work to proceed with only the slight delay necessary to place a temporary deck on the pile bents previously driven and capped, forming temporary crossings on which the track was laid. Permanent decks were installed later. All material for the bridges and culverts was furnished by the railway, the contractor providing the labor at unit prices per lineal foot for piling, per thousand ft. B. M. for bridges and trestles, and per cu. yd. for concrete masonry. The steel bridges were erected by contract, the railway furnishing the material.

The main track was laid with second-hand 75-lb. rail, and second-hand 61-lb. rail was placed in side tracks. Creosoted and oil-treated ties were used for both main tracks and sidings. The main track was fully tie plated. The track laying was done by company forces using a Hurley track laying machine at the west end and a McCabe & Steen track laying machine at the east end. Negro and Mexican laborers were employed on this

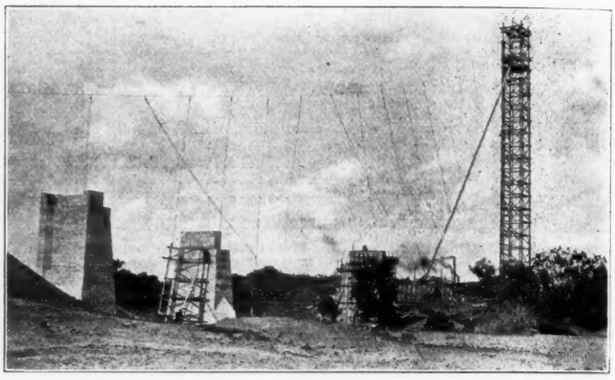


Fig. 5—Placing Concrete from an Elevated Tower

work and considerable difficulty was encountered in securing sufficient forces due to the disturbances in Mexico. Passing tracks 3,500 ft. in length and spaced 14 ft. from the main track were placed at intervals of approximately five miles.

At the time the track east of Lubbock was laid it had not been fully decided by the management to ballast the line with rock and it was therefore surfaced with material obtained at various points along the line. Seventy miles of track from Lubbock, east, was surfaced on six in. of gyp rock of excellent character obtained from a pit near Lubbock and the same material was used for surfacing the line from Lubbock west to Texico. In October, 1911, a company stone crushing plant was placed in operation nine miles west of Coleman and an excellent

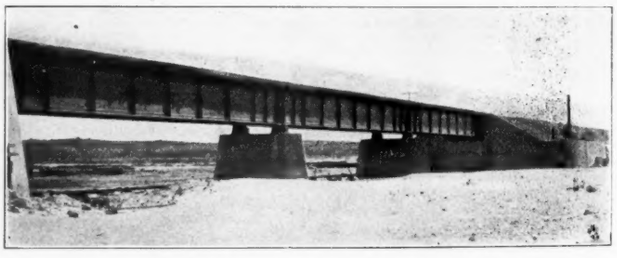


Fig. 6—Typical Girder Structure

grade of rock ballast has been secured from this point. Ballasting from this quarry has proceeded steadily westward from Coleman since this plant was placed in operation. This plant has a capacity of about 1,100 yds. per day and is equipped with modern crushing machinery including one Gates No. 8 breaker with one No. 6 and one No. 5 crusher fitted with chilled steel concaves. Oil is used as fuel for producing steam for the 250 h. p. Corliss engine and the Ingersoll-Rand air compressor operating the air drills.

Modern terminal facilities have been established at Sweetwater and Slaton, practically 100 miles apart. The buildings including the round houses, machine shops, etc., are of concrete construction and are equipped with full complements of modern tools and appliances for housing and repairing motive power and equipment. Fairbanks-Morse mechanical coaling plants and fuel oil plants are provided. Oil burning engines are used east of Sweetwater and coal west; Sweetwater being the dividing line between the Gulf and Coast lines.

Excellent supplies of water have been installed at considerable expense along the line. Four large reservoirs were constructed, the largest one with a capacity of 300,000,000 gal. being formed at Sweetwater by the construction of a dam across Kildugan creek, and water softening plants of modern design were in-

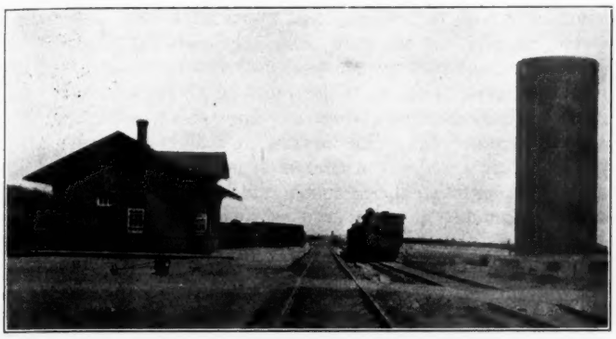


Fig. 7—Typical Station Building at Small Town and Steel Stand Pipe

stalled at some of the stations. Sixty-foot steel tanks have been provided at each point.

In keeping with the high character of construction, terra cotta and concrete passenger stations have been erected at Sweetwater,

Fig. 8—Material Yard at Coleman

Snyder Post and Lubbock, the four principal towns on this line. These structures cost about $25,000 each and are of pleasing design, as illustrated by the Sweetwater station shown herewith. They will compare favorably with stations in many older towns and cities of several times the population of the above mentioned places. At other points on this line passenger and freight stations of neat and substantial frame construction were provided.

Harvey eating houses were located at Sweetwater and Slaton, the building at the latter point being attractive in design, modern in every respect and costing approximately $50,000. At Slaton a large brick and concrete building has been erected for reading and recreation rooms for company employees.

This line was originally located in 1906 and actual construction was commenced in March, 1909, under the general supervision of W. B. Storey, vice-president in charge of construction. F. Meredith Jones was in charge of the location while the construction was handled under the direction of G. W. Harris, chief engineer of construction. The contract for grading and for all pile and timber trestles and concrete masonry for bridge foundations was awarded to the C. H. Sharp Contracting Company of Kansas City. The steel bridges were erected by the Missouri Valley Bridge & Iron Company, Leavenworth, Kan.; the terminal buildings at Sweetwater and Slaton were built by the Witherspoon-Englar Company, Chicago, while the reading and recreation rooms at Slaton were erected by Joseph E. Nelson & Sons, Chicago. All frame buildings, including depots and water stations were built by company forces.

RATE ADVANCE CASE

The Interstate Commerce Commission announces that the public conferences on the spotting of cars on private side tracks, ferry car or trap car service, lighterage and drayage, reconsignments and diversions in transit, will be held at the New Willard Hotel in Washington, on February 12, 13 and 14. At that time the commission desires such light as may be possible on the following points:

Under what circumstances, and upon what terms, do the carriers construct, maintain and operate industrial spurs?

What is the extent of the service they render upon such spurs? Give the number of cars spotted.

Such figures as the railroad company has on the cost of that service.

Of what benefit to the shipper is the service of spotting cars?

What may be said of the propriety of imposing a charge for the service so rendered, in addition to the rate for the road haul?

If such a charge may with propriety be imposed, shall it be uniform or shall the spurs be classified? If so, on what basis?

Under what circumstances and terms are reconsignments and diversions in transit permitted?

What is the extent of the service imposed upon the carrier by the reconsignment privileges?

Are the charges, if any, now made for these reconsignment

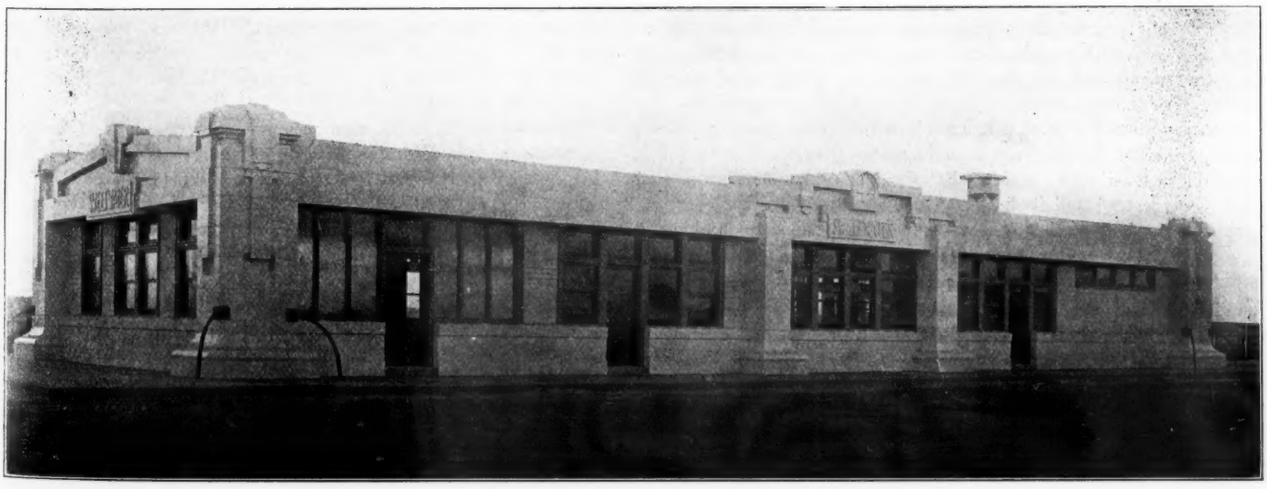


Fig. 9—Passenger Station at Sweetwater, Tex.

or diversion. Services adequate? If not, what should they be?

Of what benefit to the shipper is the service of reconsignment or diversion?

Nature and extent of the trap and ferry car service. The situation in Chicago in regard to these services may be taken as illustrative.

What is the cost and value of such service, and the propriety of the existing charges?

What facilities are offered by the Chicago tunnel, and to what extent is the tunnel service paid for by the carriers?

What is the nature and extent of the lighterage and drayage privileges allowed in Chicago?

What is the cost and value of such lighterage and drayage services and the propriety of the charges therefor, if any?

SAFETY FIRST

By John McManamy

District Inspector, Locomotive Boiler Inspection, Interstate Commerce Commission, Grand Rapids, Mich.

Safety First is rapidly becoming the paramount issue in railroad circles throughout the country, and at the present time railroad officials and their employees are working as a unit in their efforts to establish a "Safety First" movement on their respective roads. The important question is; how may the best results be obtained? In my opinion there are two ways of securing immediate results along the lines upon which they are working: First, a strict compliance with the rules of the company by the employees; and second, a strict compliance with the federal laws by the railroads. Rules for the government of the employees have been framed and adopted by the railway officials in order to facilitate a prompt movement of the traffic. These rules also specify the class of men that shall be employed and retained, as well as outline their duties. An age limit, ranging between 21 and 45 years, according to the position, is set for the men entering the company's service. A high grade of men are required for all positions.

For employment in locomotive or train service the men must be educated to a certain grade, strictly temperate in their habits, of good moral character, and sound in mind and body. They are required to pass an examination on color, vision and hearing, and must sign a contract before entering the company's service requiring them to comply with the rules of the company while they remain in the service. The rules were made to facilitate the movement of traffic, and for what was considered to be a reasonable protection for railway employees and for the traveling public. A strict compliance with them will tend to reduce the number of accidents and personal injuries.

The railroads have adopted the "Safety First" movement with the idea of eliminating, in so far as possible, the dangers incident to railroading, thereby reducing the personal injury claims. The laws of this country hold the carrier responsible, in some cases, for accidents resulting in the personal injury or the death of an employee, and also for the personal injury or the death of passengers or other persons. When the rate of compensation for injuries received in such accidents is not fixed by the Workmen's Compensation bill they are usually referred to the courts and it remains for a jury to decide what the rate of compensation shall be. This is no small item of expense for the operating company when figured up at the close of each year. But when looking at the accident from the employees' point of view it would be only fair to ask, who is going to place the proper value upon the human life?

Take, for example, the young man 21 years of age who is qualified to measure up to all of the requirements, and after passing the examinations, enters the railroad service in the capacity of fireman or brakeman, and unfortunately meets with a fatal accident soon after entering the service, and at the very beginning of his manhood. What rate of compensation can be given for the life that he has lost? Or, again, take the man who has spent years in the service, and unfortunately meets with a fatal accident leaving a widow and children to mourn his loss. What rate of compensation can be given for the life that he has lost, and what rate of compensation can repay the widow and the children for the loss of a husband and a father?

The only solution of this problem is "Eternal Vigilance" on the part of every officer and employee of the company, and a strict compliance with the rules to avoid such accidents. I know the employees will say they are complying with the rules, but by referring to some of these rules I believe it will be agreed that many are being violated. The rules of all railroad companies prohibit their employees from stepping on the front end of a rapidly approaching engine or car, or walking in front of an engine or car while it is in motion, or between cars or engines in motion except under the most favorable conditions, such as when they are running at a low rate of speed and there is a good footing with the absence of frogs, switches, guard rails, etc. It is only necessary to walk through the yards of any railroad and see flagrant violations of these rules, as well as many others; but I will not devote too much time to discussing violations of the rules, as I desire to call attention to the importance of a strict compliance with the federal laws on the part of the operating company.

The rules only ouline the duty of the employees, while the federal laws outline the duties of the operating company. The laws I refer to are the safety appliance laws, the locomotive boiler inspection laws, and the hours of service laws. They were framed by representatives of the railroad employees and passed by the Senate and House of Representatives of the United States in Congress assembled, and after being signed by the President of the United States in due time became effective. The safety appliance laws and the locomotive boiler inspection laws provide that rules shall be adopted to govern the standards of safety which shall be lived up to by the carriers. Those rules were framed and adopted by a committee composed of representatives of the railroads, representatives of the railroad employees, and representatives of the Interstate Commerce Commission. With their adoption they became a part of the laws, and a strict compliance with them will tend to reduce the number of accidents and personal injuries. These laws and rules are only just and fair, and are absolutely necessary to give the railroad employees and the traveling public the protection they require, and to which they are justly entitled.

While attending the master mechanics' convention at Atlantic City in June, 1913, I listened to a discussion by the members of that association on the safety appliance laws, and the locomotive boiler inspection laws. The committee on standards recommended for adoption as the Master Mechanics Association standard, the "United States Safety Appliance Standards which apply to locomotives" as contained in the order of the Interstate Commerce Commission, dated March 13, 1911. They also recommended for adoption as the Master Mechanics Association standard, the "federal regulations for inspecting and testing of locomotive boilers and their appurtenances" as contained in the order of the Interstate Commerce Commission, dated June 2, 1911.

The sentiments of the members present were strongly in favor of adopting the recommendations of their committee, but both questions were referred to letter ballot. The result of the letter ballot indicated that the members of the Master Mechanics Association were almost unanimously in favor of adopting both of the recommendations referred to, there being only two votes cast in opposition to the adoption of the United States Safety Appliance Standards which apply to locomotives, and three votes cast in opposition to the adoption of the United States regulations for inspecting and testing locomotive boilers and their appurtenances. What better proof of the fairness of the rules could we ask than to have them adopted as standard rules for this association? But, like the rules of the railroad companies, we have found in some cases they were being flagrantly violated.

During the year ending June 30, 1912, which was the first year the locomotive boiler inspection law was in effect, there were

6,968 locomotives found in service in violation of the provisions of the law, and which were either ordered out of service for repairs, or changed and strengthened to conform to the requirements of the law, or permanently removed from service. During the year ending June 30, 1913, the second year the locomotive boiler inspection law was in effect, there were 6,690 locomotives found in service in violation of the provisions of the law, and which were either ordered out of service for repairs, or changed and strengthened to conform to the requirements of the law, or permanently removed from the service. This is a total of 13,658 locomotives found in service in violation of the provisions of the federal laws during the first two years the locomotive boiler inspection laws were in effect, or an average for each year of 10 per cent. of all of the locomotives in service in the United States. This, also, is about on a par with the violations of the safety appliance laws and the hours of service laws.

I would recommend that the railroad companies employ safety appliance inspectors, and locomotive inspectors, to inspect their equipment and locate the defective conditions, so that repairs can be made before they are discovered by the federal inspectors. In this way the railroads can avoid expense and delays to the power on account of penalties being inflicted for violations of the laws and rules that they have endorsed, and have recommended for adoption as the standard rules of the Master Mechanics Association.

INSTRUCTIONS TO FIELD PARTIES ON FEDERAL VALUATION

A tentative draft of instruction to field parties which was submitted to the engineering board of the Interstate Commerce Commission in charge of the federal valuation of railway property by the committee of engineers representing the railway president's conference committee under date of December 17, 1913, has just been published for the guidance of parties which are being started in the field. The present draft has been thoroughly discussed and in general meets with the approval of the federal board. It has not been approved, however, and it is not likely that definite action on it will be taken before early summer, at which time numerous changes may be made before it is finally issued.

The instructions follow in general the commission's classification of expenditures for road and equipment and give in considerable detail the necessary measurements and observations to be made by assistant engineers in gathering information in cases where the carrier has not in its possession such quantities and measurements. In cases where the carrier has satisfactory records differing in classification from the board's instructions, it may be desirable in checking such data to use the classification under which it has been gathered.

The tentative instructions require the accurate determination, wherever practicable, of the quantities of grading by cross sectioning, the classification of material, the number per mile and general dimensions of all ties, the measurements and mill brands of rails, the quantity and kind of ballast, and the quantities and kinds of frogs, switches, spikes, angle bars and all other track material. It is expected that in most cases prints of bridges, trestles and culverts will be furnished and that it will only be necessary to check important dimensions so that the structure actually in use may be identified with the plan. When no prints are furnished, all important dimensions are to be recorded, and in either event, careful examination is to be made of foundations, masonry work and numerous details which are specified in the instructions. Prints of buildings will also be furnished to assistant engineers when possible, and in such cases the work will consist principally of checking these prints. A list of 20 points is given covering the essential features which are to be noted in the inspection of buildings. The instructions do not cover machinery, signals, and similar special items which will be inventoried by special engineers assigned to that work.

The Interstate Commerce Commission, itself, has recently published the first issue of the final specifications for maps and profiles to become effective on February 1, 1914. The specifications are changed but little from the first tentative draft noticed in the *Railway Age Gazette* of October 3, as modified by the second tentative draft noticed in the *Railway Age Gazette* of October 17. The final decision in regard to maps already in existence is as follows: "It is not the intent of the commission to require the unnecessary construction of maps and profiles. All maps and profiles, both old and new, must be furnished upon sheets of the standard sizes, and upon material of the kind specified, and they must be produced or reproduced by the process specified. * * * Where maps and profiles already in existence contain in the opinion of the commission the necessary information in such form that it is reasonably available, these will be accepted. For the purpose of ascertaining to what extent their present maps are acceptable carriers may bring together at their principal engineering offices such maps and profiles as they desire to enter. Thereupon the commission will at once examine the same, and will indicate in writing what are acceptable in their present form, and what changes or additions should be made in order to make others acceptable."

ADVANTAGES OF THE POSITIVE MEET

On the New York, New Haven & Hartford, the train rules require that on single track, at meeting points, all trains must wait indefinitely for opposing trains of the same class, no train having right by direction. On the occasion of a revision of the book of rules, which has lately taken place, the question whether any change ought to be made in this rule was thoroughly canvassed, all of the despatchers being called upon to give their views; and not one was found who favored the rule of right by direction for his division. The reasons for preferring the New Haven practice are summarized as follows:

1. Safety. There is no fine figuring to make meeting points for trains of the same class.

2. Reduction in number of orders issued; risk and delay reduced correspondingly.

3. Elimination of time-table exceptions to the rule, correspondingly reducing the liability of misunderstanding.

4. More uniform maintenance of schedules, as it is not necessary to lengthen time near meeting points to care for usual or unusual delays at junctions.

5. Economy. A train despatcher can manage more territory.

Where the trains are numerous a despatcher has to watch them more closely than under the rule of right by direction; but he has more time in which to do this. The only advantage that the despatcher sees in the right-by-direction rule is that in case of failure of the wire fewer trains may be delayed; but the New Haven despatchers say that they have been very fortunate in dealing with emergencies of this kind. One despatcher, who has had six years' experience on another line, followed by three years on a single track line of the New Haven—where he was still at work when the change was made to the present system—says that he was converted from an advocate of the old to an advocate of the new plan in a single day's work under the new system. He notes especially the freedom from the worry, that haunts many despatchers, because a train of inferior right may not be able to make a certain point on account of its liability to lose a minute and a half at some water station or at a place where there may be an unusual amount of baggage or express matter.

Except with the very best discipline, enginemen, under right by direction, will be tempted, when they have lost time unexpectedly, to go to a meeting point with scant time clearance.

Under the right-by-direction rule, some trains have to be constantly helped by the despatcher to make their meeting points because they are just a little late. Under the New Haven rule they can help themselves; or, in other words, they need no help under those circumstances. This despatcher does not recall an instance of serious delay because of wire failure.

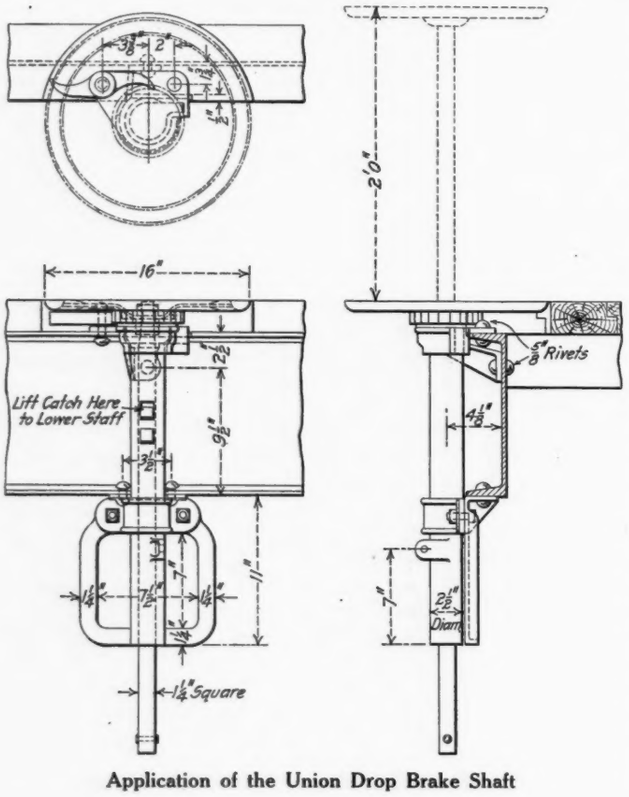
The statements made by the despatchers indicate that their opinions have been formed after careful consideration; and indeed, they are all men of considerable experience and all have had experience in despatching on lines where the right by direction was in force. One says that his telegraph and telephone services are both so reliable that there is only a remote liability of a train being delayed so as to cause serious inconvenience. There is no point on his division so isolated but that a public telephone could be found within a radius of a half mile from the station.

Just outside the Boston terminal station there is a drawbridge, and frequently it happens that from 10 to 20 trains will start out from three to five minutes late; and only a few miles out of Boston some of these trains enter upon single-track sections. It is deemed best to have trains running towards Boston superior to those running from Boston, so that, if there were to be a right by direction, the rule would cause a large number of considerable delays by reason of these small delays at the drawbridge.

While the advantages of the positive meet are most decided where first-class trains are numerous and stations are close together, the favorable views here expressed come also from divisions where the traffic is of the usual kind—largely slow freight—and where stations are not close together.

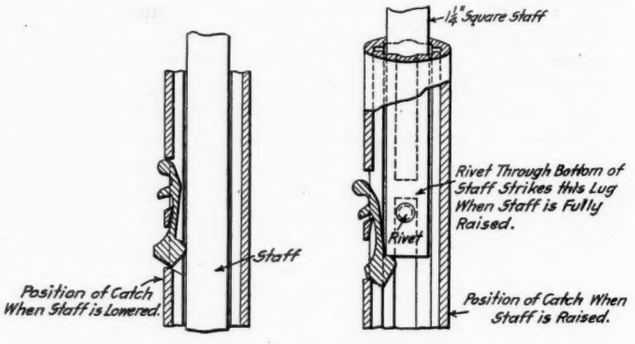
UNION DROP BRAKE SHAFT

All railroads have experienced more or less difficulty in properly maintaining hand brakes on flat cars due to the brake shafts being damaged when the cars are loaded with long material, or on account of their being removed to accommodate the loading, and not replaced. This naturally causes a heavy expense and, under the present safety appliance laws, is very serious, as the hand brakes must be maintained in an operative condition at all times.



Application of the Union Drop Brake Shaft

The Union Railway Equipment Company, Chicago, seeking to eliminate these difficulties, has recently placed on the market a new type of drop brake shaft for flat and gondola cars. As shown in the illustration, this brake shaft is arranged to drop vertically by tripping the pawl located in the face of the malleable iron brake shaft drum. In the dropped position the hand brake wheel and the upper end of the shaft are flush with the top of the car floor, which will permit of loading the car with timbers, logs, structural steel or any long material without causing any damage to the brake shaft. The shaft is raised to the operating position by pulling it up by the hand brake wheel, the pawl in the drum locking it automatically in that position. A rivet, placed in the end of the brake shaft, strikes a lug in the brake shaft drum when the shaft is fully raised, thereby preventing it from being pulled all the way out. The design of the pawl is such that, when the shaft is fully raised, it will drop of its own weight to the locking position, from which it can only be released by raising it by hand from the exposed end.


1¼" Square Staff
Rivet Through Bottom of Staff Strikes this Lug When Staff is Fully Raised.
Rivet
Staff
Position of Catch When Staff is Lowered
Position of Catch When Staff is Raised.

Section Through Brake Shaft Drum

The brackets, drum or sleeve, hand wheel, ratchet wheel and pawl, and chain guard are made of malleable iron, and the shaft is 1¼ in. square steel. The shaft is designed to meet all requirements of the United States safety appliance laws. It can be applied to old cars as well as new, and at no more expense than the old style shaft. The castings are furnished to suit any end sill construction, either wooden or steel.

A PIPE LINE IN THE CONGO.—The new pipe line that was completed in 1912, from Matadi to Leopoldville, two points on the Congo river, about 220 miles apart, the latter being the most inland, will soon be open. Petroleum will then be pumped from the reservoirs at Ango-Ango, near Matadi, to Leopoldville, and then transported to the various stations along the upper Congo and its tributaries for use by the river steamers. The installations at Ango-Ango, a point to which steamers of 6,000 tons may ascend, are now complete; the pumps have been tested and water successfully pumped from the tanks through the 4 in. pipes to Leopoldville. The pumping station there has connected with it eight tanks, each of 1,000 tons capacity, ranged along the river bank. There is also a large barge which has been made into a floating wharf, to which the oil-tank steamers may tie up for unloading. It is planned to start operations early in 1914. In the past the various river steamers have had to use wood for fuel, and that has been a drawback because of difficulty experienced in obtaining the large supply required. At the present time several large ships are under construction in European yards for use on the river. Diesel engines are being installed on many of the river steamers and all new craft destined for the Congo are of the oil-burning type. It is also reported that the Matadi-Leopoldville Railway is preparing to use petroleum as fuel, and that oil-burning locomotives are at the present time being constructed. It is expected that other railways now under construction in the interior will follow the same example. Much of the oil used thus far has been obtained from the Black Sea regions.

General News Department

The Legislature of New York has before it a bill to make passenger fares uniform throughout the state at two cents a mile. Such a law, passed in 1907, was vetoed by Governor Hughes.

Both testimony and arguments in the arbitration proceeding on the demands of the Chicago, Burlington & Quincy trainmen and conductors have been concluded and are now being considered by the board of arbitrators.

The Chicago & Alton has placed in operation a telephone train despatching line between Chicago and Bloomington. On the line between Bloomington and St. Louis telephones have been used for some time past.

The Federal Board of Mediation and Arbitration, which was created last summer has made a report; and says that eighteen serious disputes about railroad wages and other cognate matters have been brought before it, and that all of them have been settled amicably.

The "safety first" movement is to be introduced on the Canadian Government Railways. F. P. Gutelius, general manager, Moncton, announces the appointment of J. E. Long, safety engineer, as the head of the department. He is to organize committees and hold meetings.

On the Denver & Rio Grande, conductors and train auditors must now wear their caps when collecting fares and tickets, in dining cars as well as in other parts of the train. Passengers have in some cases questioned the authority of a person collecting fares without showing a badge.

The arbitrators who lately settled the rates for the wages of conductors and brakemen on the eastern roads are sitting in New York City this week to consider 134 questions concerning which the employers and employees have been unable to come to an agreement under the terms of the arbitrators' award.

Michigan union men are signing a petition circulated by former Pere Marquette employees who struck on May 28, 1912, asking the President and Congress for a federal investigation of the road. The petition contains a number of charges about the alleged poor condition of the company's equipment since the strike, and asks that if the alleged conditions cannot be remedied by legislation the road be confiscated and operated by the government.

The Baltimore & Ohio has been notified by the Director-General of the International Safety and Sanitation Exposition, which was held in New York last December, that a Grand Prize has been awarded its exhibit, showing what the road has done to prevent accidents. Included in the exhibit was a sign setting forth that there had not been a fatal injury to a passenger in a train accident on the Baltimore & Ohio during the last six years, and that in that period 128,119,933 passengers had been handled.

In 1910, the Southern Pacific, Pacific system, handled about six and a half million pieces of baggage; in 1911, it handled six and a quarter million; and in 1912, it handled almost seven and a quarter million. For the three years, the total was 19,831,248. Out of this number, only 180 pieces went astray—an average of 60 pieces a year. And in many cases, baggage would not have gone astray had passengers themselves checked their belongings, had them rechecked, when necessary, or changed the checking when they changed their own destination en route.

The Pennsylvania Railroad's announcement that the enormous passenger business of the year 1913 had been conducted without a train accident causing loss of life to a passenger, was noticed, with commendatory headlines, by more than a hundred newspapers; and Vice-President Atterbury has issued a pamphlet containing photographic reproductions of some of these notices—greatly reduced—together with reprints, full size, of about forty of some of the most appreciative editorials. Some of these are from papers published in states far distant from the Pennsylvania's territory.

Following the announcement of the decision of the Interstate Commerce Commission, holding that per diem and other allowances made by the railroads to industrial lines were illegal (*Railway Age Gazette*, January 30, page 233), the American Railway Association, through its committee on relations between railroads, last week decided that 19 short railways belonging to industrial plants should be no longer eligible to participate in the per diem agreement for the payment of car service. It is expected that a large number of other roads of this character will soon be excluded and thus will be forced to pay demurrage.

Representative Stevens of Minnesota has introduced in Congress a bill to increase the number of interstate commerce commissioners from 7 to 9 and to provide that, for hearing cases, the board may be divided into groups of three. A clause of the bill provides for the establishment of branch offices. Mr. Stevens would separate the bureaus which attend to the enforcement of the safety appliance laws, etc., and transfer them to the Department of Labor, under the head of a commissioner who would receive $5,000 a year. Mr. Bell of Georgia has introduced a bill to allow publishers to contract with carriers for advertising to be paid for in transportation.

Acting on charges published in the New York World, insinuating that the purchase of the New York, Westchester & Boston by the New York, New Haven & Hartford was attended with corrupt dealings which have not been properly investigated, the Senate, at Washington, last week, adopted a resolution calling on the Interstate Commerce Commission to reopen its investigation of the management of the New Haven road during the past eight years. In the report on that investigation, which was made by Commissioner Prouty, it was declared that the New Haven road had paid for the Westchester $12,000,000 more than it was worth and that, so far as the company's records disclosed, this sum had "vanished into thin air."

Baltimore & Ohio Police Report

The annual report of the police department of the Baltimore & Ohio, G. A. Ogline, superintendent, shows that 13,129 arrests were made during 1913, as compared with 10,417 arrests during 1912. Convictions 8,449 and 6,515. Arrests for intoxication and disorder numbered 2,526, with 1,567 arrests for larceny, 176 for burglary and 3 for murder. For receiving goods stolen from the railroad there were 67 arrests.

Commenting upon the large number of arrests of trespassers —8,303—Mr. Ogline says: "It is evident that the number of persons unlawfully riding over the railroads and trespassing in other ways is on the increase, but the officers are badly handicapped on account of the lack of co-operation on the part of authorities. The courts will handle a few offenders, but it is continually impressed upon the railroad's police department that arrests of trespassers must be held to the minimum because the cities, towns and counties are unwilling to bear the expense of keeping this class of offenders in jails and other institutions of detention. In sections of Pennsylvania, West Virginia and Ohio, however, where sentences to work on county roads and at other hard labor have been imposed, trespassing is not so general as in other territory."

In numerous instances where reports were made of obstructions having been placed on rails, missiles thrown at trains, etc., it was found that "very small children were often guilty of these offenses," and the railroad officers frequently brought the cases to the attention of parents in an effort to correct the trouble.

Reference is made in the report to the recovery of a shipment of valuable rugs which was washed out of the freight station at Zanesville, O., during the spring floods. The rugs, 14 in num-

ber and valued at $9,000, were gathered up in the flood debris. When recovered they were being used as kitchen carpets and as doormats in small houses in the flood district, regardless of the fact that some of the rugs had cost as much as $1,500 each.

The I. J. C.

There are 1,127,940 registered motor cars in the United States, one for every 84 persons. And the 1914 crop is estimated at 350,000. Automobile statistics are becoming more and more amazing. What boots it if there be freight cars idle, so long as there be no list of idle motor cars? It is only a question of time when we shall have an Interstate Joy-riding Commission.—*Puck.*

Why, of course! Interstate journeys of feathered birds are already regulated from Washington.

B. & O. Veterans

Employees of the Baltimore & Ohio, who have been twenty years or more in the service, are organizing a Veteran Employees' Association, with social and fraternal features. There is to be a branch on each division. Branches have been established in Philadelphia with 369 members, and in Baltimore with 279 members. Other branches will be organized in the near future at Brunswick, Md., with 180 members; Cumberland, Md., 100; Newark, Ohio, 100; Pittsburgh, 400; Grafton, W. Va., 100; Wheeling, W. Va., 75; Chicago Junction, Ohio, 125, and Garrett, Ind., 60. After these branches have been organized, the association will be extended to the Baltimore & Ohio Southwestern, the Cincinnati, Hamilton & Dayton and the Staten Island lines. One of the objects of the association is to lend assistance to the families of the members, should help be required, in event of death. The education of deceased members' children will be provided for and such other assistance as comes within the province of the association will be rendered. Membership is voluntary and the dues have been made nominal.

Lord Strathcona's Bequest to Yale

The gift of $500,000 to Yale University in the will of the late Lord Strathcona is made "as an expression of his appreciation of the benefits he gained from investments in the United States, particularly from the St. Paul, Minneapolis & Manitoba and the Great Northern railways." The will directs that the money shall be used for "the promotion of the modern sciences and for instruction in the practical questions arising from the application of scientific knowledge to the industrial, social and economical problems of the time, it being my special desire to have the said sum expended so far as in the opinion of my trustees may be deemed advisable, for instruction in civil and mechanical engineering, with special reference to the construction, equipment and operation of [instrumentalities of] transportation of passengers and freight, whether by land or water, and the financial and legislative questions involved." The university is empowered to equip buildings or to endow chairs for the promotion of these ends, and the giving of scholarships in the scientific or graduate department is provided for. In awarding these scholarships preference is to be given to persons who for two years or more have been creditably connected with the railway companies above named, as officer or employee, and to their children.

Railway Presidents' Valuation Committee

Thomas W. Hulme, general secretary, Broad Street Station, Philadelphia, has issued a circular summarizing the work, up to the end of 1913, of the conference committee of presidents which was organized last April to deal with questions connected with the federal valuation of the railroads of the United States.

Arrangements for making suitable maps and the necessary inventories are now pretty well completed and the presidents are considering the question of adding to the inventories proper statements of values. Meetings have been held during the past month in Chicago, Washington and New York to discuss this subject. The relations of this committee with the officers of the government have been so cordial that great benefits have been accomplished and are expected in the future; and it is hoped to avoid much duplication of expense.

After several months' discussion, it was so evident that the carriers possessed in their records so much of the information that the Government desired that any thought of proceeding independently of the carriers would be regarded as unwise, and greatly prolong the time required to do the work. There gradually developed a feeling that the carriers could be required to and should furnish the information in their records, and that the Government should ascertain through field parties the information not possessed by the carriers. As the records of companies, as a rule, contain very little information as to grading, it is generally understood—although not definitely agreed upon—that the carriers shall furnish lists of their improvements, classified in accordance with Road and Equipment Accounts, other than grading, which shall be ascertained by the Government. Where it is necessary for the carriers to send parties into the field to complete their records, the Government may send a representative with them, and the carriers may have a representative with the Government field forces which will measure the grading and check up the carriers' property lists. It is understood that arrangement shall be made for the prompt settlement, by other representatives of the parties, of any differences that may arise in the field. The Government has been advised that the carriers are willing to promptly furnish descriptive classified lists of their propery with the understanding that they could later file complete inventories showing values. The Government Engineering Board has welcomed these suggestions, and the form of these lists and the method to be pursued in compiling them is now under consideration.

On May 1, 109 companies had signified their intention to support the Presidents' Committee; since that time the number has been increased to 157, representing, with but few exceptions, all of the companies whose earnings exceed $1,000,000 a year. The companies have almost without exception appointed Valuation Committees in accordance with the plan adopted by the presidents' committees. The establishment of the Group headquarters has been arranged for in Pennsylvania, New York, Washington and Chicago. From these information can be obtained or will be distributed by counsel, engineers and such other officers as may be found necessary.

"G. W."*

The public will meet you half way if you are willing to do the right thing. In other words, the question of holding the Good Will of the public answers itself.

Good Will—G. W.—Great Western. When you are writing G. W., which we all do so many times, think of Good Will; as a man thinketh in his heart, so is he.

It's what you are that counts. Let Good Will radiate from you to every man, woman and child with whom you come in contact, and good will in the shape of passenger and freight business will return to you even more than you had hoped for; to say nothing of the personal friends you will make.

There are "cranks" of all kinds, but the chances are we can learn something from them. Ill Temper never got a man anywhere except into trouble. We have heard much about Courtesy to Customers. Go further than being courteous. You could easily be courteous and still drive a customer away.

A farmer called me out of bed at 10 o'clock at night to deliver him his freight. I could have stood on my rights and have been ever so courteous in my refusal to wait on him, but could I have shown him good will?

This man lived about as near a competing line station as mine, and had, as I learned afterwards, always received his shipments at that point, but the agent, an able man, by the way, takes its upon himself to advise every receiver of freight from mail order houses, that they had better buy at home. The next time this farmer came to town, he handed me a three-quart pail full of the nicest fresh eggs, with the remark "My wife sent these to your wife."

Good Will is like Great Western cars—no good unless in use. My first acquaintance with a certain rich old farmer whose land adjoins our right-of-way, was when he called at my office and inquired in a very surly manner, and without any preliminary conversation, when we were going to pay him for those oats. . . . "Your engine set fire to my oats and if they are not settled for at once, I will put the matter in the hands of a lawyer"; and away he went. I mentally put him down for an

*From a paper by R. M. Wilson, agent of the Chicago Great Western at Bolan, Iowa, read before the C. G. W. Agents' Association at Fort Dodge, January 17.

old fool, but not wishing to start in at a station by making enemies, I got busy with our claim agent and found he had appraised the loss and that a check in payment would come soon, and in a few days I had the pleasure of handing the old gentleman his money, when he said in a very different voice, "I am much obliged to you, Mr. Wilson. . . ."

A few days ago, in comes Mr. Grouch. He had sold his farm and was going to move to Minnesota. . . . Notwithstanding the fact that our competitors could give him several hours better time on a through train as against our local he decided to "Give Wilson first chance," and we got the shipment, 6 cars. Great, isn't it? Notice the letters G. W.—Good Will—Give Wilson—Great Western.

One Way to Educate the Public

The Chicago Great Western is having semi-monthly bulletins containing facts about railway affairs distributed in all its waiting rooms and freight offices. In addition a monthly leaflet is distributed to all passengers on trains and at ticket offices. The road is encouraging large shippers along the line to give facts of interest for this purpose, and last month distributed the following statement by William Galloway, president of the William Galloway Company, of Waterloo, Iowa, addressed "To the Traveling Public":

"In my opinion the railroads should have the co-operation of the public. The average man who rides on a railway train does not realize or know what the fellows are doing who are behind the curtain managing and operating such great systems.

"The average individual does not realize what the railroad operator has to contend with in the way of weather, elements, etc., in order to run his train on time. When all these things are considered, in my opinion it behooves the public to support and encourage the railroads rather than find fault and knock. The great trouble today is everybody has some kick coming that is unwarranted. Many people wish to start legislation against railroads when they do not really know what they are doing.

"Railroad companies have to live; it costs money for payrolls, expenses, repairs, etc. They should be given due consideration and careful thought, because it is the railroads that have made this great country of ours possible and prosperous. Take away the railroads and the land would have no value, because good markets would be shut off and impossible.

"You cannot get good service from a railroad without compensation. Experience has proved that the more prosperous the railroad company the better their roadbed, their trains and their service. In other words, you get what you pay for. Starvation rates mean poor roadbed, poor equipment and poor service."

Full Crews But No Trains

The Legislature of Virginia has before it an extra crew bill and also a bill limiting the length of freight trains to 50 cars. President George W. Stevens of the Chesapeake & Ohio has written a letter, which has been sent to all employees of the road, calling attention to the vicious character of the last named bill. The letter says:

"It is assumed that the men employed in the train service of the Chesapeake & Ohio do not appreciate the disaster that will ensue if the bill . . . limiting the size of freight trains to 50 cars is passed. It is well known that, if a westbound train is limited to 50 empty cars, an eastbound train cannot be given to exceed 40 loaded cars, if the power is equalized. The bill, if passed, means that the railway company would, in my opinion, be compelled to withdraw from the Tidewater coal traffic, as it could only be conducted at a loss.

"The Chesapeake & Ohio hauls Tidewater coal a greater distance than its competitors at the North, and must, in order to provide its shippers with an Eastern market, make a rate that pays but 3 mills per ton per mile; or, in other words, must haul a ton of coal three and one-third miles to earn 1 cent. Out of this net revenue must be provided a sufficient sum to pay the interest on funded debt, taxes (increasing yearly), and a meagre dividend to stockholders. It is reasonable to assume that any further reduction in the rate or increase in the cost of performing the service will result in the loss of the traffic. Naturally, this will be followed by a reduction in the number of men employed in the train service in Virginia, estimated at not less than 50 per cent.

"This also applies in a measure to the extra crew bill. The railway company and its employees in the train service should be equally interested in preventing the passage of these bills."

The Virginian Railway and the Norfolk & Western are affected in the same way.

One More to Come

"The country is ready, therefore, to accept, and accept with relief as well as approval, a law which will confer upon the Interstate Commerce Commission the power to superintend and regulate the financial operations by which the railroads are henceforth to be supplied with the money they need."—*President Wilson's message.*

It's nice to be a railroad man,
He does not have to think.
The I. C. C. does that for him;
He's sure the lucky gink.
But he doesn't seem to like it
And at times to anger moves,
Forgetting that the Master
Chastens those he loves.

They tell him just the number
That must make up a crew,
And just the sort of cars to run
And when to run 'em too.
They tell him how much more to pay
On wage account—and then
They tell him just the hours
That he may work the men.

The rates, of course, they regulate.
Never up, but down,
And now on all these sorrows
They are placing sorrow's crown.
With traffic poor and earnings (net)
Down to a beggar's dole,
They are going now to tell him
How he may fill the hole:

The hole that's made by all
The other 57 laws.
One other's only left to come,
And only one because
There's nothing left to regulate,
Except the kind of trains
That shall carry to the graveyard
The railroad man's remains.

—D. T. P.

Safety First on the New Haven

A meeting to promote "safety first," which was held under the auspices of the New York, New Haven & Hartford at Boston, January 25, was reported briefly in our issue of January 30. From the full report of the address of President James H. Hustis, since received, we quote:

"My experience with the accident question, extending now over a period of 35 years, has impressed me with two things. The first is the great fidelity and faithfulness to duty on the part of railroad workers, both officers and men. The second is that most of the great accidents of this country have been due to an oversight or neglect of a character so simple that it is difficult to understand how the accident could have been permitted to occur. . . .

"Without fully realizing what it all means, we have been drifting into a new era under new conditions; some call it the 'New freedom.' It is an age of rebellion against authority. We see it in the government, the church, the schools and even in the home. So it is not surprising that it exists on the railroad. If discipline is to be maintained, there must be authority. Authority can be exercised in two ways. One through fear and the other through respect. It is the latter method which we must adopt if we are to secure the best results.

"The present method of dealing between management and men is largely through committees. With experienced men on

these committees, men who fully appreciate their responsibilities and are ready to assume them, men who understand the importance of the questions that come before them, men who intend to deal fairly, there can be no question as to the value of the organizations and their helpfulness in bringing about better results. I am personally acquainted with many of the men on the committees of these organizations in New England at the present time, and I know that they fully appreciate their responsibilities. I know many who have been very helpful in attempting to solve this most difficult problem, and it is a most difficult problem, the seriousness of which is recognized generally, but is not understood.

"Movements have sprung up amongst us offering panaceas for all the ills the railroad flesh is heir to; 'efficiency movements' seem to be the order of the day. . . . There is always danger in the railroad service of over-emphasizing the importance of one department over another, and while safety itself cannot be over-emphasized, it is possible to so conduct a department intended to promote safety that its very purpose may be defeated. The 'safety first' movement should be encouraged and supported along reasonable lines, but there can only be safe operation on railroads when there is back of it all something more than the joining of an organization or the wearing of a button, however worthy may be its purpose. No one thing will contribute more toward the safe operation of a railroad than a force that is loyal to its interest.

"The one serious danger confronting us today is not the absence of steel cars or modern signals, important as they are; it is the absence of the personal touch in our dealings with one another. Until we secure mutual respect and confidence in one another we shall not have 'safety first' in its purest and best sense. The loyalty of a force to a public property is its greatest asset. In the old days when an accident occurred, the character of the discipline meted out depended largely on whether the 'old man' was in good or bad humor. This method had its advantages, but today we look at it differently. The old method had its good results. It was of special value to officers who desired to deal fairly with their men, and there were many such. They heard the story, knew the men and the circumstances, judged the facts on their merits, applied the discipline. . . . Because of the personal relation there was a mutual respect and understanding that is lacking in the present system.

"However, because of certain injustices arising in the old-time practice, the men banded together and now we have labor organizations. Each organization has grievance committees. The danger of it all is that these proceedings are likely to take too much of the legal and too little account of the personal element, substituting a committee for the individual himself. The present method lacks the heart-to-heart feature of the old, defective though the old may have been. Our problem therefore is to adapt the good in the old to present-day methods and conditions. It is the duty of the management to show in a practical way its confidence in you. It is your duty to return this confidence. Mistakes will be made on both sides, but if together we seek a true solution in a proper spirit, and with mutual respect, the outcome cannot be in doubt."

Railroad Holocaust in Mexico

In a tunnel of the Mexico Northwestern, near Cumbre, Mexico, 227 miles south of El Paso, Tex., the middle of last week, a passenger train on which were 50 or more passengers was destroyed by fire, the train having been sent into the tunnel, for the purpose of destroying it, by Maximo Castillo, a bandit chief, whose purpose was to work revenge on the insurgent government (which rules in that region) for having put to death 22 of Castillo's followers. It is said that the passengers and trainmen were locked in the cars, and that all perished.

The reports as yet are fragmentary, but it appears that Castillo took possession of a cattle train, at the southern end of the tunnel, set the cars afire and then moved the train into the tunnel. The bandit and his followers then marched over the mountain to the north end of the tunnel and there took possession of the passenger train and sent it south to collide with the freight. The heat, smoke and gases thwarted the efforts of rescuers for several days. Among the passengers on the train were a number of Americans, including certain officers of the road; and some of the trainmen were Americans. Included among the victims are Messrs. Scofield, Gilmartin, Leo Williams, E. J. McCutcheon, J. E. Webster and H. F. Marders.

International Congress on Social Insurance

This organization is to hold a meeting in Washington in October, 1915. The American Committee on Organization has elected as chairman Hon. Franklin MacVeagh, of Washington, former secretary of the treasury. The secretary of the committee is M. M. Dawson, New York, and the treasurer Arthur Williams, New York. Julius Kruttschnitt, chairman of the board of directors of the Southern Pacific, New York City, is a member of the executive committee.

This will be the first of these congresses to be held in the United States, although such congresses have been held now for twenty-five years. The International Permanent Committee has headquarters in Paris. The Congress was established as a result of the legislation in Germany, followed by other countries, establishing insurance of workmen against accidents, sickness, invalidity and the like. It is primarily an official body, composed of delegates of the various governments of the world; but others who are interested in the subject may become members. Already in the United States within five years there have been enacted laws in no less than twenty-two States changing the basis of liability of employers from that of negligence to compensation for all industrial accidents.

Inquiries concerning the Congress should be sent to the Committee on Organization, International Congress of Social Insurance, 141 Broadway, New York.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 5-8, Hotel Pontchartrain, Detroit, Mich.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, 1914, St. Louis.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Next convention, April 21, Houston, Tex.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Thursday and Friday in May.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConnaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 17-20, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpen Building, Chicago. June 15-17, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Next convention, July 20-22, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. June 16-19, St. Paul-Minneapolis, Minn.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, Highland Park, Ill. Annual meeting, June 24, Minneapolis, Minn.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Next convention, May, 1914, St. Paul, Minn.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago. Next convention, May 20-23, New Orleans, La.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.

ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Detroit, Mich. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after second Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. H. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, May 13, Hotel Galvez, Galveston, Tex.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago. Annual convention, May 18-22, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 14-17, Hotel Sherman, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 26-29, Hotel Waldron, Philadelphia.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen building, Chicago. June 10-12, Atlantic City, N. J.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3rd Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc, Ry. Elec. Engrs.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio. Next convention, May 18-20, Washington, D. C.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, 519 Boston building, Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, August, Chicago.

UTAH SOCIETY OF ENGINEERS.—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3d Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Karpen building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News

The Interstate Commerce Commission will hold hearings February 17 on the application of the Pennsylvania Railroad for authority to continue the ownership and operation of its steamers on the Great Lakes.

William E. Cullen, who has been connected with the traffic department of the Chicago, Rock Island & Pacific, at Chicago, has been appointed secretary and traffic director of the Traffic Bureau of Associated Industries, Central Manufacturing District, Chicago.

The Farm Bureau of the New York Central announces to the farmers of central New York that the road has secured the establishment of companies to pulverize limestone so that this fertilizer can be delivered at from 55 cents to $2.25 a ton, or less than one-quarter of the prices heretofore prevailing. To promote more general draining of farm lands, the Farm Bureau has provided itself with a ditching machine, which will be rented to farmers at cost; and the bureau will give advice concerning drainage.

At a meeting of shippers held in New York City on February 5 at which a resolution was adopted favoring the application of the eastern railroads for authority to increase freight rates, about 200 shippers were present or represented, and more than 100 of them signed the resolution. The meeting was presided over by Victor J. Dowling, a Justice of the Supreme Court of New York. After the meeting, about 400 additional signatures were added to the resolution, and it was sent to Washington.

The Public Service Commission of Maryland has notified the express companies doing business in that state to defer the adoption, for intrastate traffic, of the new basis of rates prescribed by the Interstate Commerce Commission for interstate business, the commission having found, after investigation, that many important rates in Maryland are at the present time lower than those which would have to be charged according to the new plan. The express companies are now at work preparing revised tariffs.

Conductors as Traffic Solicitors

A supply of individual business cards and prospective traffic cards has been furnished to all passenger conductors on the St. Louis & San Francisco, with a view to having them assist in the solicitation of business. The individual cards bear the words, "It will always be our desire to make your trip comfortable and pleasant on a 'Frisco train." The prospective traffic card bears the motto, "Let us have an opportunity to demonstrate to you that we can handle your carload and L. C. L. business to your entire satisfaction. Our service is strictly first-class."

This plan of soliciting business is being tried out, based on the fact that passenger conductors are well acquainted with a large number of shippers and receivers of freight and are adding to their acquaintance daily. When a conductor meets a prospective shipper on any one of his trips, he is to hand him one of his business cards as well as one of the prospective traffic cards, which he is asked to fill in—or the conductor may fill in this card for the prospective shipper—after which it is to be mailed to the superintendent of the division on which the conductor is employed. The superintendent in turn forwards the card to the proper traffic officer or agent. A record of the number of cards turned in by each conductor will be kept.

Panama Railroad Storage and Demurrage Rates

The old rate of five cents a package a day on material stored in the sheds of the Panama railroad docks, and the car demurrage rate of $5 a car a day, have been superseded by a reduced tariff. Considerable quantities of goods are brought to the Isthmus for trans-shipment to another steamer which may not arrive in port for several days after the cargo is discharged. This necessitates storing the freight in the dock

sheds pending an opportunity for reloading. Under the new schedule, a charge of 10 cents a ton a day will be made on all goods stored in the dock sheds, with a minimum charge of 50 cents a ton for a single day's storage. For car demurrage, a rate of $2.50 a car a day has been fixed, with no free allowances. The railroad assumes no responsibility for loss or damage while freight is in storage on dock, or in cars, or for breakage in handling. The present rate of 50 cents a ton for the transfer of freight from one vessel to another will be maintained.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 161, giving a summary of car surpluses and shortages by groups from October 10, 1912, to February 1, 1914, says: The total surplus on February 1, 1914, was 211,960 cars; on January 15, 1914, 217,274 cars, and on February 1, 1913, 62,045 cars.

Compared with the preceding period; there is a decrease in the total car surplus of 5,314 cars, of which 6,455 is in box, 511 in flat, 1,660 in coal and gondola, and an increase of 3,312 in miscellaneous car surplus. The decrease in box car surplus was in groups 2 (New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania); 3 (Ohio, Indiana, Michigan and Western Pennsylvania); 4 (the Carolinas and Virginias); 5 (Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida); 6 (Iowa, Illinois, Wisconsin and Minnesota); 7 (Montana, Wyoming and the Dakotas); 8 (Kansas, Colorado, Oklahoma, Missouri and Arkansas); 9 (Texas, Louisiana and Mexico) and 10 (Washington, Oregon, Idaho, California, Nevada and Arizona). The decrease in flat car surplus was in groups 2, 5, 6, 9 and 10 (as above). The decrease in coal and gondola car surplus was in groups 2, 9 and 10 (as above). The increase in miscellaneous car surplus was in groups 1 (New England Lines), 2, 3, 5, 6, 7, 8 and 9 (as above).

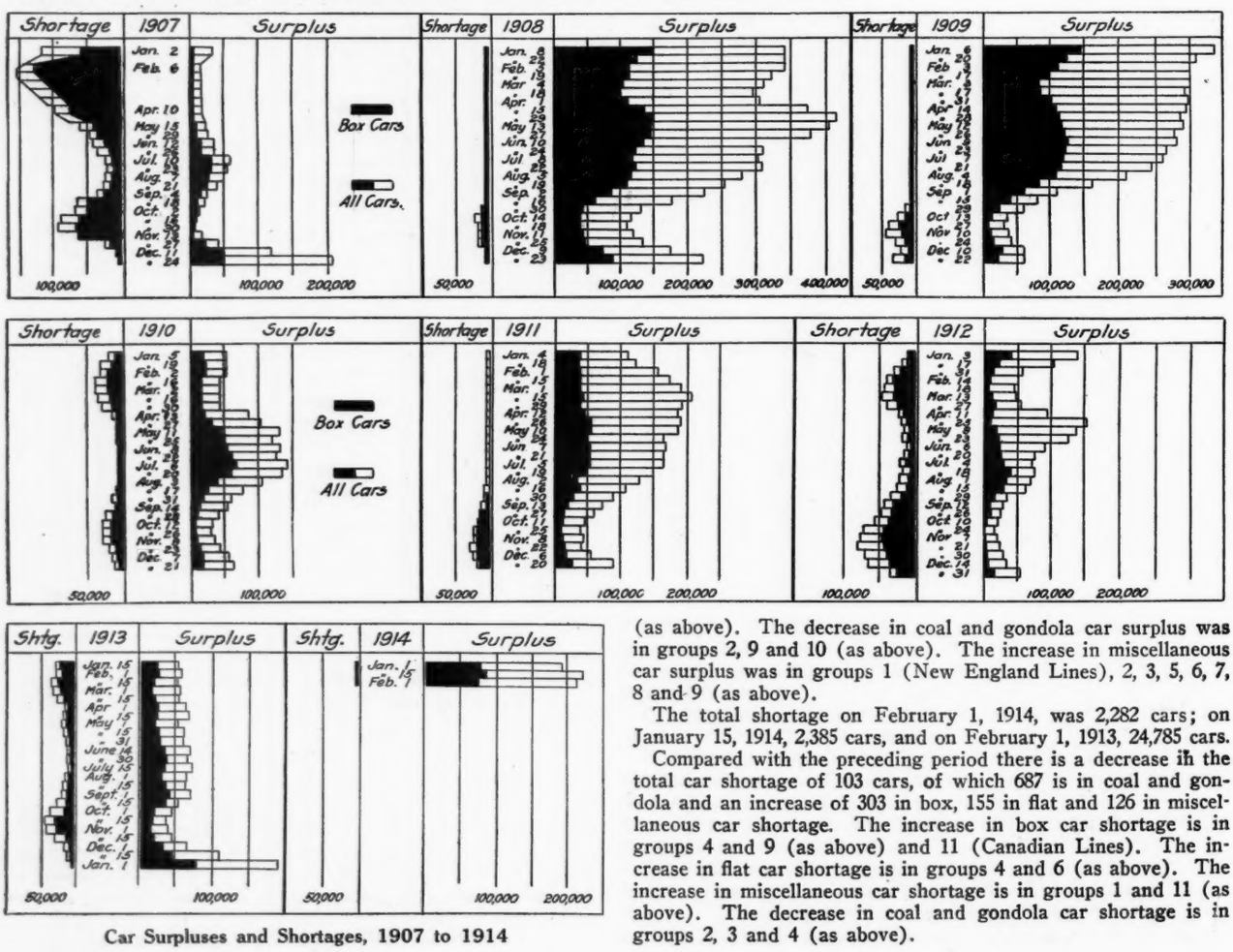
The total shortage on February 1, 1914, was 2,282 cars; on January 15, 1914, 2,385 cars, and on February 1, 1913, 24,785 cars.

Compared with the preceding period there is a decrease in the total car shortage of 103 cars, of which 687 is in coal and gondola and an increase of 303 in box, 155 in flat and 126 in miscellaneous car shortage. The increase in box car shortage is in groups 4 and 9 (as above) and 11 (Canadian Lines). The increase in flat car shortage is in groups 4 and 6 (as above). The increase in miscellaneous car shortage is in groups 1 and 11 (as above). The decrease in coal and gondola car shortage is in groups 2, 3 and 4 (as above).

CAR SURPLUSES AND SHORTAGES

Date	No. of roads.	Surpluses: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—February 1, 1914	7	540	739	1,885	62	3,226	304	0	0	361	665
" 2.— " 1, 1914	33	3,066	963	16,591	6,231	26,851	0	1	0	0	1
" 3.— " 1, 1914	29	9,146	2,089	41,702	4,869	57,806	30	0	0	3	33
" 4.— " 1, 1914	12	7,435	1,035	4,614	1,892	14,976	100	16	15	30	161
" 5.— " 1, 1914	22	3,451	428	7,353	1,304	12,536	0	0	65	0	65
" 6.— " 1, 1914	30	8,534	1,066	4,298	6,253	20,151	167	293	14	3	477
" 7.— " 1, 1914	3	293	110	1,235	932	2,570	0	0	0	0	0
" 8.— " 1, 1914	18	5,422	553	3,078	2,799	11,852	0	0	0	0	0
" 9.— " 1, 1914	12	2,780	268	376	1,116	4,540	100	0	0	0	100
" 10.— " 1, 1914	23	8,379	3,414	4,357	10,989	27,139	0	0	8	22	30
" 11.— " 1, 1914	5	25,255	2,722	0	2,336	30,313	686	0	0	64	750
Total	194	74,301	13,387	85,489	38,783	211,960	1,387	310	102	483	2,282

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1914

Compared with the corresponding period of last year; there is an increase in the total car surplus of 149,915 cars, of which 51,301 is in box, 8,231 in flat, 68,592 in coal and gondola and 21,791 in miscellaneous car surplus. There is a decrease in the total car shortage of 22,503 cars, of which 15,306 is in box, 1,558 in flat, 4,618 in coal and gondola and 1,021 in miscellaneous car shortage.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

Revenues and Expenses of Large Steam Roads for December

The following figures were compiled by the Interstate Commerce Commission from monthly reports of operating revenues and expenses of large steam roads for the month of December, on hand February 5, 1914. No reports are included for roads whose operating revenues for the year ended June 30, 1913, did not reach $1,000,000. The figures are compiled as rendered and should not be considered final, inasmuch as scrutiny of the reports may lead to their modification before acceptance.

Item	United States		Eastern District		Southern District		Western District	
	1913	1912	1913	1912	1913	1912	1913	1912
Number of reports included	164		66		31		67	
For the Month of December								
Average number of miles operated	216,031.26	214,103.99	54,489.43	54,220.25	40,195.41	39,874.53	121,345.92	120,009.21
Total operating revenues	$239,759,516	$250,740,756	$102,922,208	$107,549,669	$41,123,003	$38,932,959	$95,714,305	$104,258,123
Total operating expenses	174,034,932	172,524,020	80,287,878	78,157,652	27,990,774	26,396,981	65,756,280	67,969,337
Net operating revenue	65,724,584	78,216,736	22,634,330	29,392,017	13,132,229	12,535,978	29,958,025	36,283,741
Revenues per mile	1,110	1,171	1,588	1,983	1,023	976	789	869
Expenses per mile	806	806	1,473	1,441	696	662	542	567
Net revenue per mile	304	365	415	542	327	314	247	302
For the Six Months Ending with December								
Average number of miles operated	215,664.97	213,306.84	54,503.83	54,233.14	40,160.75	39,827.57	121,000.39	119,246.13
Total operating revenues	$1,561,391,279	$1,555,511,143	$680,531,523	$677,687,766	$233,876,712	$222,415,565	$646,983,044	$655,407,812
Total operating expenses	1,080,857,759	1,018,703,393	496,729,997	456,373,295	165,856,614	155,867,341	418,271,158	406,462,757
Net operating revenue	480,533,510	536,807,750	183,801,526	221,314,471	68,020,098	66,548,224	228,711,886	248,945,055
Revenues per mile	7,240	7,292	12,486	12,496	5,823	5,584	5,347	5,496
Expenses per mile	5,012	4,775	9,114	8,415	4,130	3,914	3,457	3,409
Net revenue per mile	2,228	2,517	3,372	4,081	1,693	1,670	1,890	2,087
Comparative Figures Based on All Roads Having Revenues Above $1,000,000 Per Annum Reporting for December, 1912								
For the Month—	1912	1911	1912	1911	1912	1911	1912	1911
Average number of miles operated	221,418.34	219,234.21	57,831.53	57,629.68	41,494,07	41,100.96	122,092.74	120,503.57
Revenues per mile	$1,164	$1,046	$1,931	$1,740	$959	$888	$871	$768
Expenses per mile	803	720	1,406	1,234	652	606	569	513
Net revenue per mile	361	326	525	506	307	282	302	255
For Six Months—								
Average number of miles operated	220,888.28	218,700.85	57.844.40	57,552.99	41,448.52	41,078.65	121,595.36	120,069.21
Revenues per mile	$7,246	$6,591	$12,164	$11,024	$5,489	$5,165	$5,505	$4,953
Expenses per mile	4,755	4,330	8,218	7,404	3,859	3,559	3,413	3,157
Net revenue per mile	2,491	2,241	3,946	3,620	1,630	1,605	2,092	1,796

Car Location

The accompanying table, which was taken from bulletin No. 14-A of the American Railway Association, gives a summary of freight car location by groups on January 15, 1914.

	Car Location on January 15, 1914											
	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned	88,016	699,677	281,103	206,100	176,305	492,562	20,093	156,812	31,732	144,509	99,755	2,396,664
Home Cars on Home Roads	48,865	451,025	121,655	127,805	103,925	349,692	8,421	91,235	15,921	85,967	76,956	1,481.467
Home Cars on Foreign Roads	39,151	248,652	159,448	78,295	72,380	142,870	11,672	65,577	15,811	58,542	22,799	915,197
Foreign Cars on Home Roads	39,091	233,804	183,192	78,435	67,532	133,087	12,737	61,985	32,116	50,994	12,961	905,934
Total Cars on Line	87,956	684,829	304,847	206,240	171,457	482,779	21,158	153,220	48,037	136,961	89,917	2,387,401
Excess or Deficiency	*60	*14,848	23,744	140	*4,848	*9,783	1,065	*3,592	16,305	*7,548	*9,838	*9,263
Surplus	1,409	57,367	33,376	16,378	13,661	20,122	1,754	10,943	9,272	29,439	23,553	217,274
Shortage	722	486	109	313	120	341	115	66	32	39	42	2,385
Shop Cars—												
Home Cars in Home Shops	5,032	51,776	19,042	13,652	11,432	29,512	896	11,792	2,364	5,580	4,437	155,515
Foreign Cars in Home Shops	752	6,337	7,177	1,855	1,452	3,739	752	1,878	1,271	2,211	229	27,653
Total Cars in Shops	5,784	58,113	26,219	15,507	12,884	33,251	1,648	13,670	3,635	7,791	4,666	183,168
Per Cent. to Total Cars Owned—												
Home Cars on Home Roads	55.52	64.46	43.28	62.01	58.95	70.99	41.91	58.18	50.17	59.49	77.15	61.81
Total Cars on Line	97.78	97.88	108.37	100.07	97.25	98.01	105.30	96.40	151.38	94.78	90.14	99.61
Home Cars in Home Shops	5.71	7.40	6.78	6.62	6.49	6.03	4.46	7.53	7.45	3.86	4.45	6.49
Foreign Cars in Home Shops	.68	.90	2.55	.90	.82	.76	3.74	1.12	4.01	1.53	.23	1.15
Total Cars in Shops	6.39	8.30	9.33	7.52	7.31	6.79	8.20	8.65	11.46	5.39	4.68	7.64

*Denotes deficiency.

Texas Commission Refuses Advance in Rates

The Texas Railroad Commission has refused a petition for a hearing to consider the advisability of a horizontal advance of 15 per cent. in freight rates in the state presented after having been adopted at a meeting of the general managers of 31 Texas railroads on January 14. Chairman Mayfield, of the commission, addressed a letter to a committee of the general managers, explaining the refusal, in which he said in part:

"Twice since the so-called compromise of 1899, namely in 1903 and 1908, there has been an increase in the freight rates for interstate commerce, amounting in the first instance to something like 5 per cent., and in the last instance between 7 and 10 per cent. In the first instance the Interstate Commerce Commission, at its own instigation, investigated the matter and declared that the advances were made as the result of concerted action and intimated that the same was in violation of the anti-trust laws. The last advance was confessedly the result of concerted action of the railroads interested in the southwest. In other words, when I came on the railroad commission, the first class rate from St. Louis to Texas common points was $1.30 per 100 pounds, while today the rate is $1.47 per 100 pounds. This illustrates what has been done on interstate commerce so far as it affects Texas.

"It is estimated that about two-thirds of the revenue derived from freight is from interstate traffic. Therefore, it follows that on two-thirds of your income from freight transportation you have had two extraordinary increases.

"And that is not all; the rate for passenger transportation is three cents per mile in Texas as against two cents in adjoining states that are similarly situated.

"The railroad commission heretofore has opposed a reduction in your passenger tariff, believing that it could better serve those of the state who needed your service by making reductions in the freight charges instead of the passenger charges.

"There is no merit in your application and it is refused."

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has further suspended from February 14 to August 14 certain schedules in tariffs of the Lehigh Valley containing proposed increased rates on anthracite coal in carloads from mines in the Wyoming district of Pennsylvania to Perth Amboy, N. J.

The commission has further suspended from February 8 to August 8 certain schedules in a Louisville & Nashville tariff by which it was proposed to reduce rates on coal from mines on the Louisville & Nashville in Virginia west of Middleborough to points north of the Ohio.

The commission has suspended to May 1 certain schedules in a tariff of F. A. Leland, agent, containing proposed increased rates on grain and grain products in carloads from Kansas City and other Missouri river points when originating beyond and from St. Louis when originating beyond to stations located in Louisiana.

The commission has further suspended from February 28 to August 28, schedules in tariffs of R. H. Countiss, agent, providing for the cancellation of through rates on lumber and articles taking lumber rates from points on the Oregon-Washington routing via Plummer, Idaho, and the Chicago, Milwaukee & St. Paul, to points on or reached via the latter road.

The commission has suspended from February 6 to June 6, an item in a Missouri Pacific, St. Louis, Iron Mountain & Southern tariff, providing for the withdrawal and cancellation of transit privileges on grain and grain products at Leavenworth and Atchison, Kan., on grain originating beyond Council Bluffs, Omaha and South Omaha, when destined to points beyond Kansas City.

The United States Senate on February 2 adopted a resolution requesting the commission to conduct an examination for the purpose of ascertaining whether the United States Steel Corporation, or any of its subsidiaries, has been guilty of giving or receiving any unlawful rebates, offsets or preferences, especially within the last six years. The commission has therefore ordered an inquiry into the matters referred to and has served notice to that effect upon all the common carriers subject to the act to regulate commerce and upon the steel corporation and its various subsidiary companies.

The Interstate Commerce Commission's hearing at Chicago on private car lines, which was temporarily adjourned on February 2, was resumed and concluded on February 5, and an adjournment was taken to Jacksonville, Fla., where a hearing will begin on February 25 to a large number of fruit shippers. The question of tank cars will be considered at a later hearing. At the hearing last Thursday W. H. Hosmer, chairman of the Western Trunk Line Committee; R. S. Fyfe, chairman of the Western Classification Committee, and Eugene Morris, chairman of the Central Freight Association, testified regarding classification provisions for mixing shipments of packing house products.

Weighing of Coal

S. C. Schenck v. Norfolk & Western et al. Opinion by the commission:

Complaint is made against a rule of the Norfolk & Western whereby charges on coal shipments are assessed on weights ascertained only at the railway's regular weighing stations. The commission finds such to be unjust. The carrier should provide also for reweighing at destination on the request of the consignee. (29 I. C. C., 125.)

Fiber Furniture Ratings

Michigan Seating Company v. Grand Trunk Western et al. Opinion by the commission:

Complaint is made against the rating in the official classification which includes fiber furniture with bamboo, grass, rattan, reed and willow furniture which is given a rating of three times first class when shipped in less than carload lots. The commission finds that rates on fiber furniture from Jackson, Mich., to points in other states where rates are governed by the official classification should not exceed double first class rates. Fiber furniture is about 50 per cent. heavier than reed and reed in turn is heavier than either willow or rattan. (29 I. C. C., 123.)

Unreported Opinions

Tusten Seed & Produce Co., Ltd., v. Vicksburg, Shreveport & Pacific et al:

Upon a rehearing the commission finds that the rates charged on various shipments from St. Louis, Mo., and points in central freight association territory, to Shreveport, La., were unreasonable.

Eastern Talc Company v. Missouri Pacific et al:

The commission finds that the rate from East St. Louis, Ill., to Kansas City, Mo., on ground talc in carloads, originating at East Granville, Vt., is unduly prejudicial to the extent that it exceeds the rate contemporaneously in effect on soapstone dust. Reparation, however, is denied.

J. K. Gill Company v. Oregon-Washington Railroad & Navigation Company et al:

The commission finds that a rate of double first-class on a less than carload shipment of mimeographs and neostyles from Chicago, Ill., to Portland, Ore., is unreasonable and that the rate in the future should not exceed 1½ times first class. Reparation awarded.

Central Commercial Company v. Delaware & Hudson et al:

The commission finds that the rate on crushed slate or slate dust in bulk, in carloads, from Poultney, Vt., to points in central freight association territory is unduly prejudicial in comparison with the rate on crushed feldspar.

Rockford Lumber & Fuel Company v. Chicago, Milwaukee & St. Paul et al:

The commission finds that a rate of 14 cents per 100 lb. charged for the transportation of a carload of fuel wood from Wells, Mich., to Rochelle, Ill., was unreasonable in that it exceeded the aggregate of the intermediate rates. Reparation awarded.

Gulf Lumber Company v. St. Louis & San Francisco et al.

The commission finds that a rate of $5.40 per ton on rails and fastenings from Winona, Mo., to Leesville, La., is unreasonable in that it exceeds the rate from Kansas City and St. Louis.

Tennessee Lumber Manufacturing Company v. Beaver Dam Railroad et al.

The commission finds that the present rates on relaying rails, frogs, switches, spikes, etc., in carloads from Sutherland, Tenn., to points in Virginia, Tennessee, etc., are not unreasonable.

G. H. St. John & Company v. Union Pacific et al.

The commission finds that the rate charged on certain shipments of hay from Odessa and Elm Creek, Neb., to Superior, Wis., was in accordance with the tariff and not unreasonable.

Chattanooga Sewer Pipe & Fire Brick Company v. Alabama Great Southern et al.

A rate of 35 cents per 100 lb. charged on 15 carloads of earthen sewer pipe from Birmingham, Ala., to Lake Charles, La., is found to be unreasonable in that it exceeded the subsequently established rate of 28 cents.

James G. Wright et al v. Chicago & Northwestern.

The commission holds that it is an undue discrimination for a carrier to prefer branch line points to main line points when supplying cars. No reparation is awarded, however.

Salina Produce Company v. Missouri Pafic et al.

The commission finds that certain rates charged by the defendants on a carload of kaffir corn originating at Curtis, Okla., from Concordia, Kan., were not unreasonable.

Allen & Lewis et al v. Chicago & Northwestern et al.

The commission finds that certain charges collected on certain shipments of candy from points east of the Missouri to Portland, Ore., were in accordance with the published rates and not unreasonable.

Standard Grain & Milling Company v. Chicago & Northwestern et al.
The commission finds that a rate of 28 cents per 100 lb. charged on four carloads of grain screenings from New Ulm, Minn., to Kansas City, Mo., was unreasonable in that it exceeded a rate of 14 cents. Reparation awarded.

Caddo River Lumber Company v. Caddo & Choctaw et al.
Reparation is awarded on account of unreasonable rates charged on lumber shipped from points in Arkansas, Louisiana and Texas to western Nebraska and Kansas.

Cornie Stave Company v. Chicago, Rock Island & Pacific.
The commission finds that a scheme whereby local rates to complainant's barrel stave mill are collected on inbound shipments and a difference in the local rate and the concentration rate refunded on the outbound shipment of the finished product, is not unreasonable.

Cowen Heineberg Company v. Atchison, Topeka & Santa Fe et al.
The commission finds a double first class rate charged on two shipments of cigars in boxes, secured by lead seals, from San Francisco to New York to be unreasonable in that it exceeded the first class rate. Reparation awarded.

Carolina Dierks v. Southern Pacific et al.
Certain charges collected by the defendants for the transportation of three passengers from San Francisco, Cal., to Lincoln, Neb., are found to have been unreasonable. Reparation awarded.

Woods-Evertz Stove Company v. Chicago, Rock Island & Pacific et al.
The commission finds that certain charges collected on a shipment of stoves from Springfield, Mo., to Shawnee, Okla., were not unreasonable.

Bigham & Rose v. Texas & Pacific et al.
The commission finds that rates charged for the transportation of 48 carloads of beef cattle from El Paso, Texas, to Oklahoma City, Okla., were not unreasonable.

Bartlesville Supply Co., v. Atchison, Topeka & Santa Fe et al.
The charges collected for the transportation of a carload of iron sucker rods and iron tubing, Keystone, Ind., to Bartlesville, Okla., are not found to have been unreasonable.

Chanslor & Lyon Motor Supply Company et al v. Pennsylvania Railroad et al.
Double first class rates charged on electric warning signals or horns in less than carload lots from Newark, N. J., to San Francisco are not found to be unreasonable.

Tyler Grocery Company v. Southern Express et al.
The commission finds that a rate of $4.25 per 100 lb. charged on a shipment of paper cartons, New York to Birmingham, Ala., is not unreasonable.

Dallas Lumber & Logging Company v. Southern Pacific.
The commission finds that the rate charged on four carloads of lumber from Dallas, Ore., to Weed, Cal., is not unreasonable.

W. E. Pence & Brother v. Chesapeake & Ohio et al.
The commission dismisses a complaint against certain unreasonable charges on two carload shipments of hogs on the basis that the complaint is barred by the statute of limitation.

E. L. Eakle Lumber Company v. Norfolk & Western et al.
The commission finds that the charges on 49 telegraph poles from Lyndhurst, Va., to Dunwoodie, N. Y., were assessed on the actual weight of the shipment and were not therefore unreasonable.

Miller Brothers v. Oregon Short Line et al.
A claim for reparation is dismissed on the ground that it is barred by the statute of limitations.

Bessemer Refining Company v. Pennsylvania Company et al.
A rate of 8.5 cents per 100 lb. on crude petroleum in carloads from Columbiana, O., to Titusville, Pa., is upheld.

Feeders' Supply Company v. Missouri, Kansas & Texas of Texas et al.
The combination of intermediate rates based on Kansas City applied on shipments of cotton seed cake from Bartlett, Tex., to Burns and Burdick, Kan., is not found unreasonable.

Dean Electric Company v. Lake Shore & Michigan Southern et al.
The commission finds that certain double first class rates charged on a shipment of Tuto and Rexo horns from Elyria, Ohio, to San Francisco, were not unreasonable.

Valley Lumber & Timber Company v. Western Maryland et al.
The commission finds that rates on ties from Hill Creek, Kern, and Pushall, W. Va., to Bradford Junction, Pa., which exceed the rate on lumber between the same points are unreasonable, and awards reparation.

Inter-Mountain Auto Company v. Lake Shore & Michigan Southern et al.
The commission finds that a shipment of automobiles from Wagon Works, Iowa, to Boise, Idaho, was not misrouted by the initial carrier, but that the Northern Pacific misrouted the shipment from Minnesota Transfer.

Schermerhorn Brothers Company v. Pittsburg, Cincinnati, Chicago & St. Louis et al.
The commission finds that certain rates charged on wicking in less than carload lots from Madison, Ind., to Birmingham, Ala., and Ottumwa, Ia., from Boston, Mass., to Chicago, Ill., were not unreasonable.

Western Rock Salt Company v. Atchison, Topeka & Santa Fe et al.
A rate of 26 cents per 100 lb. on rock salt in carloads from Lyons, Kan., to certain points in Texas is held not to be unreasonable.

Mixed Carloads of Live Stock

George M. Lee v. St. Louis Southwestern. Opinion by the commission:
The commission awards reparation for certain unreasonable charges collected by the defendant for the transportation of a mixed carload of hogs and cattle from Bradley, Ark., to East St. Louis, Ill. (29 I. C. C., 101.)

Rates on Damaged Material

E. Danciger vs. Pittsburgh, Cincinnati, Chicago & St. Louis et al. Opinion by the commission:
Complainant shipped a carload of damaged overalls and one of damaged gloves from Dayton, Ohio, to Superior, Wis., and was charged the regular rate on first class goods. The commission finds that the rate charged was correct. It would be difficult to establish a rate on old or second hand goods not affording a convenient means for misbilling and discrimination. (29 I. C. C., 99.)

Condensed Milk Rates Between Points in Illinois and Wisconsin

Opinion by Commissioner McChord:
In this case the commission finds that a tariff rule establishing a commodity rate between points in Illinois and Wisconsin on "milk condensed or evaporated in cans, boxed," works discrimination against those shipping condensed milk in barrels, half barrels or kegs, and that it should be amended as to include condensed milk so shipped. (29 I. C. C., 43.)

Reparation Awarded for Discrimination

Carl Eichenburg v. Southern Pacific et al. Opinion by Commissioner McChord:
Upon the original hearing of this case the commission held that the complainant had been unlawfully discriminated against by the defendants in the matter of certain dock privileges at Galveston, Tex. Complainant now files a bill of reparation of $48,341.54. The commission finds that much is included in that bill of damages which should not be, and holds that the complainant is entitled to recover only the admitted per ton advantage of 40 cents per ton upon the 300 tons of cottonseed meal and cake shown to have been shipped over the defendants' wharfs. (28 I. C. C., 584.)

Chicago Switching Charges

Opinion by Commissioner McChord:

The commission held, in a former case, that on carload shipments to Rose Hill, Ill., rates of 20 cents per net ton on bituminous and 10 cents per net ton on anthracite coal in excess of the charges for similar transportation to Ravenswood, Ill., a point about 1½ miles south of Rose Hill, and nearer Chicago, were discrimination against Rose Hill, and that a proper spread between the points should not exceed five cents. The carriers attempted to comply with the commission's order not by lowering the Rose Hill rate, but by raising the Ravenswood local rate to 25 cents on anthracite, so that Ravenswood was put on a basis of 15 cents and 5 cents per net ton higher on bituminous and anthracite respectively than points immediately south of it and in competition with it. The commission finds that compliance with the order in that fashion is not justified, and that neither is a change justified whereby the through rates or application of the Chicago basis in the tariffs of the line-haul carriers is withdrawn and the absorption on consignments to Ravenswood is reduced from $6 to $4 per car. (28 I. C. C., 677.)

STATE COMMISSIONS

The Pennsylvania Railroad has applied to the Pennsylvania Water Supply Commission for permission to construct a bridge over the Susquehanna at Mehaffey.

A large delegation of Kansas City produce dealers appeared at a hearing before the Missouri Public Service Commission on February 4 to protest against the team track storage charge recently imposed by the railways for cars held on tracks beyond the free time. The charge is in addition to demurrage.

The Farmers' Grain Dealers' Association and the Illinois Grain Dealers' Association at a hearing before the Illinois Public Utilities Commission on February 3 presented a vigorous protest against a proposed order of the commission withdrawing its suspension of an advance of one cent per 100 lb. in the rates on grain. The Interstate Commerce Commission has allowed the increase on interstate shipments.

The reduced rates for the transportation of merchandise by express which were prescribed by the Wisconsin State Railroad Commission some time since went into effect on February 1, along with the interstate rates recently reduced by the Interstate Commerce Commission. The suits begun by the express companies in court to restrain the Wisconsin Commission have been dismissed. By the new Wisconsin tariff the charges on many articles will be reduced 20 per cent. or more.

The railroad commission of Louisiana has ordered the Kansas City Southern to repair its road between Mansfield and its southern termini, about 160 miles, so as to bring it "up to the standard of a first-class railroad." The order must be carried out within three months. As to what weights of cars or engines the track is to be fitted for, or what speeds are to be allowed, the order is silent. A sufficient number of new and sound ties must be put into the track and all broken rails must be replaced with sound rails, properly fastened together.

The Public Service Commission of Pennsylvania has ruled that the granting without unfair discrimination, by the railroad companies of the state, of free passes to their officers and employees, to be used for the transportation of the dependent members of the families of such officers and employees, will not be regarded by the commission as a violation of the law. In the new public service law, in the clause allowing passes for employees, with no mention of their families, the wording is precisely the same as that in the constitution of the state, which was adopted in 1874; but the commission bases its present action on the fact that the practice of granting passes to employees and their families has the sanction of custom for 39 years. Another ruling by the commission allows policemen and firemen to be carried free.

PERSONNEL OF COMMISSIONS

The following appointments have been made in the Western district of the Division of Valuation, Interstate Commerce Commission, with headquarters at Kansas City, Mo.:

Assistant district engineer: B. J. Dalton, formerly professor of railway engineering at the University of Kansas.

Senior civil engineer in charge of road and track department: Clifton B. Spencer, formerly office engineer of the St. Louis & San Francisco, at St. Louis, Mo.

Senior mechanical engineer in charge of the mechanical department, including motive power and car equipment: Francis H. Adams, formerly engineer of shop extensions, Santa Fe System, Topeka, Kan.

Senior structural engineer in charge of bridge and building department: Frank B. Scheetz, formerly contract engineer of the Kansas City Bridge Company.

P. F. Laift, hitherto assistant superintenedent for Holabird & Roche, Chicago, is to be head of the architectural department of the Central district, with office at Chicago.

William G. Atwood has resigned as chief engineer of the Lake Erie & Western, with office at Indianapolis, Ind., to become assistant district engineer for the Board of Valuation Engineers, Interstate Commerce Commission, with headquarters at Chattanooga, Tenn. He was born August 4, 1872, at Fredonia, N. Y., and was graduated from Cornell University, College of Civil Engineering, in 1892. From 1892 to 1897 he was engaged in municipal work at Chicago, and from 1897 to 1902 he was mining engineer and United States deputy surveyor for Alaska. From 1902 to 1904 he was locating engineer and superintendent of construction on the Alaska Central Railway, and from 1905 to 1907, assistant engineer of construction with the same road. From 1907 to 1908, he was division engineer of the Lake Shore & Michigan Southern, and from 1909 to date, chief engineer of the Lake Erie & Western.

W. G. Atwood

George Newland Brown, whose appointment as an examiner for the Interstate Commerce Commission has been announced, was born in Huntington, Mass., April 18, 1859, and was educated in the high school at Elmwood, Ill., from which he was graduated in 1877. He edited newspapers in Galva and Wyoming, Ill., and was engaged as reporter and editor of newspapers in Peoria, Ill.; Kansas City, Mo.; Denver, Col., and Cheyenne, Wyo. He was private secretary to Congressman Frank W. Mondell, of Wyoming, and Congressman Benjamin F. Marsh, of Illinois, and in 1896 was graduated from the National University in Washington, D. C., with the degree of LL.B., and the next year the University gave him the degree of LL.M. He was admitted to the bar in 1897 and practiced law in Chicago for four years. In 1901 he was appointed assistant attorney of the Interior Department and served there under Justice Willis Vandevanter of the United States Supreme Court, who, at that time, was assistant attorney general. Mr. Brown was appointed an examiner of the Interstate Commerce Commission July 1, 1906, and served four years as chief examiner of the commission.

George N. Brown

In an editorial in last week's issue, page 257, the name of one of the Interstate Commerce Commission's new examiner-attorneys, Edward W. Hines, was incorrectly stated as Norman Hines.

R. D. Rynder, whose appointment as chief examiner for the Interstate Commerce Commission, has been announced, was born at Altoona, Pa., July 3, 1882, and was graduated from the High School at Erie, Pa., in 1898. After doing clerical work for several years he entered the Indiana University, at Bloomington, Ind., and completed the academic course in the spring of 1904. In the same year he obtained a clerkship, by competitive examination, in the Civil Service Commission, at Washington, and on December 5, 1904, was transferred to the Interstate Commerce Commission as clerk in the office of the assistant secretary of the commission, Mr. Decker. After a few months he was appointed chief clerk of Mr. Decker's office; and on July 1, 1907, was appointed private secretary to the chairman of the commission. While holding these positions he studied law at the National University, and was graduated in the spring of 1908, receiving the medal awarded for the highest standing during the course. On July 1, 1910, he was appointed attorney and special examiner for the commission. In 1911, 1912 and 1913, he acted as a member of the commission's Board of Review, Board of Suspensions, and Board of Reference. In his new position of chief examiner he has general supervision of the assignment of cases for hearing and of all the legal work of the commission, except that performed by the commissioners personally, and the trial in courts of suits to set aside or annul orders of the commission, which is conducted by the solicitor of the commission.

R. D. Rynder

COURT NEWS

The Illinois Supreme Court has appointed a commissioner to take testimony in the appeal of the Illinois Central from the demand of the state auditor for $2,131,000 in additional taxes for 1913.

Judge Smith McPherson, of the United States Court, at Kansas City, Mo., on February 6, filed a decree entering the mandate of the United States Supreme Court which sustained the state freight and passenger rate laws. The decree dismisses the original injunction issued by the court restraining the enforcement of the laws and also the injunction to restrain the attorney general from proceeding in state courts to recover the excess charges collected during the life of the injunction. Thirteen railways in the state have taken an appeal to the Supreme Court for an order compelling Judge McPherson to retain jurisdiction of the claims for refunds.

The plan of compromise of the suit brought by the attorney general of Texas against the Missouri, Kansas & Texas under the anti-trust laws in connection with a merger of branch lines in Texas specifically authorized by the legislature, but which the attorney general declared unconstitutional, was filed in court at Austin, Tex., on February 6. By the compromise the suit will be abandoned and the Missouri, Kansas & Texas of Kansas agrees to convey its interest in the Missouri, Kansas & Texas of Texas to H. E. Hildebrand, of San Antonio, to be conveyed by him to the Central Trust Company, of New York, as trustee for the Kansas company. The Missouri, Kansas & Texas of Texas also agrees to spend $6,000,000 on improvements in Texas.

Railway Officers

Executive, Financial, Legal and Accounting

Richard W. Barrett, who has been in the legal department of the Lehigh Valley since 1911, has been appointed assistant general solicitor, with office at New York.

Morris McDonald, president of the Boston & Maine and the Maine Central, has resigned from the Boston & Maine to devote his time wholly to the affairs of the Maine Central.

F. L. McCaffery has been appointed auditor of disbursements of the Southern Pacific, with headquarters at San Francisco, Cal., succeeding G. W. Mulks, transferred to the New York office.

W. R. Scott, general manager of the Southern Pacific at San Francisco, Cal., has been appointed vice-president and general manager, with headquarters at San Francisco, succeeding E. E. Calvin as vice-president.

L. L. Knight has been appointed auditor of the Macon, Dublin & Savannah, with headquarters at Macon, Ga. He succeeds as auditor A. S. Hale, whose entire time will in future be devoted to the offices of secretary and treasurer.

O. H. Bower has been appointed auditor of the Missouri, Kansas & Texas Railway of Texas, succeeding F. C. Anderson, resigned, and J. O. Talbott has been appointed auditor of receipts, succeeding F. W. Pope, resigned to accept service with another company, both with offices at Dallas, Tex.

Sam A. Leake and W. T. Henry, comprising the firm of Leake & Henry, Dallas, Tex., have been appointed general attorneys for the Missouri Pacific and St. Louis, Iron Mountain & Southern in Texas, with the exception of the counties of Bexar, Benders, Kendall, Comal, Guadalupe, Wilson, Atascosa, Medina and Uvalde, which will remain under the jurisdiction of Guinn & McNeill, of San Antonio, Tex.

Operating

The office of assistant superintendent of the Arizona Eastern at Hayden Junction, Ariz., has been abolished, and J. F. Goodrich has been assigned to other duties.

E. E. Kerwin, who recently resigned as division superintendent of the Central of New Jersey, has been appointed general superintendent of the Minneapolis & St. Louis.

M. Crown, assistant district superintendent of the Atlantic Coast Line at Sanford, Fla., has been appointed superintendent of terminals, with headquarters at Jacksonville, Fla.

S. E. Burkhead, superintendent of the Ft. Worth division of the International & Great Northern at Mart, Tex., has been appointed assistant general manager, with headquarters at Houston, Tex. Mr. Burkhead is succeeded by E. Wilson, trainmaster at Palestine, Tex.

Owing to the death of J. B. Baker, superintendent of the Philadelphia Terminal division of the Pennsylvania Railroad at West Philadelphia, Pa., the duties of that position, until further notice, will be performed by H. C. Bixler, assistant superintendent of the Philadelphia Terminal division at West Philadelphia.

H. V. Platt, general superintendent of the Southern district of the Southern Pacific at Los Angeles, has been appointed assistant general manager, with headquarters at Los Angeles. D. W. Campbell, general superintendent of the Northern district, has been appointed assistant general manager, with office at Portland, Oregon, and the offices of general superintendent are abolished. See Executive, Financial, Legal and Accounting.

R. A. McCranie, who has been appointed general superintendent of the Atlantic Coast Line, with headquarters at Savannah, Ga., as has been announced in these columns, was born on December 28, 1870, in Georgia. He began railroad work in 1887 with the Plant System, and was a telegraph operator until 1889. He was later for one year despatcher, and then to 1905, he was trainmaster. He was appointed superintendent of terminals

at Jacksonville, Fla., in 1905, and the following year became superintendent of the Waycross district at Waycross, Ga., of the Atlantic Coast Line, which position he held at the time of his recent appointment as general superintendent of the Second division of the same road.

Samuel B. Zartman, whose appointment as superintendent of the New Jersey Southern division of the Central of New Jersey, with headquarters at East Long Branch, N. J., has been announced in these columns, began railway work in the construction and engineering departments, during vacation periods while he was attending college. Later, he was employed in various capacities in the traffic and operating departments. He was then trainmaster on the Philadelphia & Reading, and for a time was superintendent of construction on the St. Louis & Memphis, now a part of the St. Louis & San Francisco. He was subsequently superintendent of terminals on the Seaboard Air Line, and then general agent of the Central of New Jersey at Newark, N. J., which position he held at the time of his recent appointment as superintendent of the same road as above noted.

William Walliser, whose appointment as assistant to the general managers of the Chicago & North Western, with headquarters at Chicago, has been announced in these columns, was born July 27, 1866, at West Chicago, Ill. He was educated in the public schools, and began railway work in May, 1883, with the Chicago & North Western, with which road he has remained ever since. He was engine care-taker for six months, and was then consecutively locomotive fireman, freight brakeman, and freight conductor until November, 1902, when he was made trainmaster of the Galena division. Four years later he was promoted to assistant superintendent of that division, and in March, 1909, he became superintendent of the Minnesota division. In May, 1911, Mr. Walliser was transferred to the superintendency of the east Iowa division at Belle Plaine, Iowa, where he remained until his recent appointment as assistant to the general managers, as above noted.

Charles Henry Stein, who has been appointed superintendent of the New Jersey Central and the Lehigh & Susquehanna divisions of the Central of New Jersey, with headquarters at Jersey City, N. J., was born on July 23, 1871, at Baltimore, Md., and was educated at Baltimore City College. He began railway work on December 7, 1889, and to 1893 was with the Western Maryland consecutively as rodman, transitman and assistant engineer on preliminary surveys and construction. From 1893 to May, 1903, he was assistant roadmaster of the same road and then to June 7, 1905, was assistant supervisor of the Philadelphia & Reading at Reading, Pa., becoming supervisor of the main line of the same road in June, 1905. He went to the Central of New Jersey on April 15, 1907, as engineer maintenance of way, which position he held at the time of his recent appointment as superintendent of the same road as above noted. Mr. Stein is a member of the American Society of Civil Engineers; also chairman of Committee No. 9 of the American Railway Engineering Association.

C. H. Stein

W. H. DeFrance, whose appointment as division superintendent of the Texas & Pacific, with headquarters at New Orleans, La., has already been announced in these columns, was born June 5, 1864, at Floyd, La. He began railway work when 10 years old as office boy in the general passenger office of the St. Louis, Iron Mountain & Southern, and from 1879 to 1883 was employed by the Missouri Pacific as flagman, rodman and leveler in an engineering corps. He was then with the St. Louis Southwestern until 1895 successively as assistant engineer on construction, locomotive fireman, locomotive engineer, conductor, and chief clerk to superintendent. The following six years he was in the service of the Kansas City, Pittsburg & Gulf and its successor, the Kansas City Southern, as conductor, trainmaster, and in charge of steam shovels on realinement and grade reduction work. During 1901 he was yardmaster for the Denver & Rio Grande at La Junta, Col., and the year following agent and yardmaster for the same road at Helper, Utah. Mr. DeFrance then returned to the Kansas City Southern as trainmaster and subsequently until 1907 was superintendent of the Southern division. The next five years he was with the Frisco Lines as superintendent of construction, superintendent of terminals and general superintendent of the Louisiana Southern, which was leased by the Frisco. In January, 1912, he became assistant general manager of the Alabama & Northern Transportation Company. He resigned in November, 1913, and was then until January 1 of this year engaged in special work in the first vice-president's office of the Texas & Pacific. On the latter date he was made superintendent of the Louisiana division, as above noted.

Thomas B. Hamilton, who has been appointed general manager of the Vandalia, with headquarters at St. Louis, Mo., as has been announced in these columns, was born on August 7, 1865, at Columbus, Ohio. He graduated from Princeton University in 1888, and began railway work in November of the same year as rodman on the Jeffersonville, Madison & Indianapolis, now part of the Pittsburgh, Cincinnati, Chicago & St. Louis. On January 27, 1890, he became connected with the engineering corps of the Pittsburgh division of the latter road, and six years later was made assistant engineer on the same division. He was engineer of maintenance of way from May, 1897, to June, 1901, having been consecutively on the Toledo division of the Pennsylvania Company, on the Cincinnati district of the P. C. C. & St. L., and on the Cleveland & Pittsburgh division of the Pennsylvania Company. He was then appointed superintendent of the Erie & Ashtabula division, and on December 21, 1903, was made superintendent of the Cleveland & Pittsburgh division. On January 1, 1912, he was appointed general superintendent of the Central system of the Pennsylvania Lines West of Pittsburgh, with office at Toledo, Ohio, and now becomes general manager of the Vandalia, as noted above.

T. B. Hamilton

Traffic

L. B. Johnson has been appointed commercial agent of the Norfolk Southern with office at Charlotte, N. C.

C. H. Gattis, assistant traffic manager of the Georgia & Florida, at Augusta, Ga., has resigned to go to another company.

Albert Jamieson Fox, who has been appointed assistant general freight agent of the Seaboard Air Line, with headquarters at Jacksonville, Fla., as has been announced in these columns, was born on July 22, 1879, at Newport, Ky. He entered the service of Adams Express Company, at Cincinnati, Ohio, about August, 1896, and three years later became secretary to W. E. Jones, treasurer of the Baltimore & Ohio Southwestern, remaining in that position until 1900. He was then for two months in the office of the auditor of freight receipts of the Baltimore & Ohio at Baltimore, Md. On September 1, 1900, he went to the Seaboard Air Line as stenographer and rate clerk at Baltimore, becoming soliciting freight agent the following year. He was promoted to con-

tracting freight agent in 1903, and in 1906 was made general agent at Baltimore, which position he held at the time of his recent appointment as assistant general freight agent of the same road, as above noted.

John N. Cornatzer, who on February 1 was appointed general passenger agent of the St. Louis & San Francisco, with headquarters at Memphis, Tenn., was born at Bolivar, Tenn., in 1871, and was educated in the public schools. He began railway work in 1887 as telegraph operator for the Mobile & Ohio at Humboldt, Tenn. He was subsequently station agent, and in 1892 was made city passenger agent at Cairo, Ill. Two years later he was transferred to Mobile, Ala., as ticket agent, and in 1896 became city passenger agent at St. Louis, Mo. The following year he was appointed traveling passenger agent, with headquarters at Mobile, and in 1899 was made Southeastern passenger agent at Montgomery, Ala. In 1900 Mr. Cornatzer went to the Kansas City, Fort Scott & Memphis, as general agent at Atlanta, Ga., and the following year he was appointed division passenger agent of the St. Louis & San Francisco at Memphis. Two years later he became general agent of the Frisco and Rock Island Lines at that place, and in 1906 was made assistant general passenger agent of the St. Louis & San Francisco, which position he held until his recent appointment as general passenger agent, as above noted.

Frank E. Otis, whose appointment as assistant general freight agent of the Chicago, Milwaukee & St. Paul, with headquarters at Minneapolis, Minn., has already been announced in these columns, was born February 2, 1869, at Beloit, Wis. He graduated from high school at Hudson, Wis., in June, 1886, and began railway work March 1, 1887, with the Minnesota & Northwestern now a part of the Chicago Great Western. In December, 1890, he became clerk to the commercial agent of the Chicago, Milwaukee & St. Paul at St. Paul, Minn., and in January, 1893, was transferred to Minneapolis, Minn., in a similar capacity. Two years later he was advanced to freight solicitor at Minneapolis and in the spring of 1897 was made chief clerk to the general northwestern agent at that point. The following year Mr. Otis was made traveling freight agent and in September, 1900, was appointed commercial agent at Duluth, Minn. He was transferred to St. Paul in May, 1902, as commercial agent, where he remained until his recent promotion to the position of assistant general freight agent at Minneapolis, as above noted, having been in continuous service of the St. Paul for 23 years.

F. E. Otis

Engineering and Rolling Stock

Lewis D. Freeman, chief draftsman of the Kansas City Southern, has been appointed mechanical inspector of the Seaboard Air Line, with headquarters at Portsmouth, Va.

E. I. Partlow has been appointed road foreman of engines of the Indianapolis division of the Baltimore & Ohio-Cincinnati, Hamilton & Dayton lines, in place of R. W. Brown.

F. G. White, signal inspector of the Great Northern at St. Paul, Minn., has been appointed signal engineer of the Chicago Great Western, with office at Chicago, succeeding J. Beaumont, resigned.

William G. Atwood has resigned as chief engineer of the Lake Erie & Western, with headquarters at Indianapolis, Ind., to become assistant district engineer with the board of valuation engineers, Interstate Commerce Commission, with office at Chattanooga, Tenn.

D. J. Mullen, division master mechanic of the Cleveland, Cincinnati, Chicago & St. Louis at Mattoon, Ill., has been appointed assistant to the superintendent of motive power at Indianapolis, Ind. John Karibo, general foreman at Mt. Carmel, Ill., succeeds Mr. Mullen, and E. J. Buckbee takes the place of Mr. Karibo.

The office of superintendent of motive power of the Spokane, Portland & Seattle, Oregon Trunk, Oregon Electric and United Railways, heretofore held by A. C. Adams, is abolished, and John Dickson is appointed general master mechanic in charge of mechanical matters, with headquarters at Portland, Oregon. Effective February 1.

F. H. Watts, division engineer of the Southwest system of the Pennsylvania Lines West of Pittsburgh at Columbus, Ohio, has been appointed division engineer, with office at Pittsburgh, Pa., succeeding G. Le Boutillier, promoted. G. R. Barry, division engineer at Logansport, Ind., succeeds Mr. Watts, and A. C. Watson, division engineer, of the Central system at Zanesville, Ohio, succeeds Mr. Barry.

C. C. Elmes, road foreman of engines of the Philadelphia & Reading at Tamaqua, Pa., has been appointed assistant engineer of motive power of the Philadelphia & Reading and subsidiary companies. C. A. Bingaman, engineer of tests at Reading has been appointed assistant engineer of motive power. R. B. Rasbridge, chief car inspector at Reading, has been appointed superintendent of car department. R. D. Wilson has been appointed general car inspector. T. E. Hessenbruch, general inspector at Reading has been appointed assistant general car inspector. W. E. Grove has been made inspector of the car department, and the position of master car builder has been abolished.

A. P. Prendergast, superintendent of motive power of the Baltimore & Ohio, at Baltimore, Md., resigned on December 31, last, and has been appointed superintendent of machinery of the Texas & Pacific, with headquarters at Marshall, Tex., succeeding F. S. Anthony, resigned. After graduating from the public schools in West Virginia, Mr. Prendergast took up the study of special technical subjects. He entered the service of the Baltimore & Ohio in the mechanical department in 1893 as an apprentice, and after completing his apprenticeship he served as a machinist, and subsequently was made foreman. He was then promoted to master mechanic at Grafton, W. Va., and later was transferred in the same capacity to the Riverside shops at Baltimore, Md., becoming master mechanic at the Mt. Clare shops, Baltimore, on January 1, 1910. The following November he was made superintendent of motive power of the Baltimore & Ohio Southwestern at Cincinnati, Ohio, and in May, 1912, his authority was extended over the Cincinnati, Hamilton & Dayton. In January, 1913, he was appointed superintendent of motive power of the Baltimore & Ohio proper, with headquarters at Baltimore, Md., from which position he resigned on December 31, 1913, after a service of 20 years with the Baltimore & Ohio, and now becomes superintendent of machinery of the Texas & Pacific, as above noted.

A. P. Prendergast

J. Garry Dole, whose appointment as master mechanic of the Alliance division of the Chicago, Burlington & Quincy, with headquarters at Alliance, Neb., has already been announced in these columns, was born November 7, 1880, at Mohicanville, Ohio, and received a high school education. He began railway work in October, 1897, with the Chicago, Burlington & Quincy as machinist apprentice, and subsequently from 1902 to 1906 was successively machinist for the Northern Pacific and the Chicago & North Western. The following two years he was employed by the Missouri Pacific as division foreman at Coffeyville, Kan.,

general foreman at Osawatomie, Kan., and as division foreman at Wichita, Kan. He then returned to the Burlington in 1908 as general foreman at Denver, Colo., and later was transferred to Lincoln, Neb., in a similar capacity, which position he held until January 16, when he was promoted to division master mechanic at Alliance, Neb., as above noted.

D. C. Rounseville, whose appointment as engineer of maintenance of the Chicago & North Western lines east of the Missouri river, with headquarters at Chicago, has already been announced in these columns, was born October 29, 1856, at Sheboygan, Wis. He was educated in public and private schools, and began railway work April 1, 1879, as chainman on location for the Milwaukee, Lake Shore & Western now a part of the Chicago & North Western. The following April he went to the St. Paul & Eastern Grand Trunk as instrument man, and in September of that year returned to the Milwaukee, Lake Shore & Western as assistant engineer, which position he held until March, 1884. He was then for nine years locating and construction engineer, being promoted to division engineer in 1893. Two years later he was appointed assistant engineer of the Chicago & North Western, and in September, 1897, was made division engineer of the Ashland division, where he remained until March, 1906, when he was transferred to the Manitowoc, Green Bay & North Western as resident engineer. In April, 1907, he returned to the Ashland division as division engineer, and in March, 1909, was transferred to the Milwaukee, Sparta & North Western as resident engineer. Three years later he was made resident engineer of the St. Louis, Peoria & North Western also subsidiary of the Chicago & North Western at Pekin, Ill., from which position he is now promoted to engineer of maintenance, as above noted.

Purchasing

Samuel F. Clark has been appointed purchasing agent and general storekeeper of the Spokane, Portland & Seattle, with headquarters at Portland, Oregon, succeeding J. E. Mahaney, resigned.

OBITUARY

L. C. Russell, traveling passenger agent of the Grand Trunk, with headquarters at Chicago, died in that city on February 5.

Newell S. Kimball, formerly for 30 years district master mechanic of the Chicago, Milwaukee & St. Paul at Green Bay, Wis., died in Chicago on January 31, aged 82 years.

William Hickok Taylor, vice-president of the St. Louis Southwestern since 1907, also a director and a member of the executive committee of that road, and a director of several industrial corporations, died on February 7, at his home in New York at the age of 56. Mr. Taylor was born in Brooklyn, N. Y., and graduated from Columbia College in 1880. He was a member of the University, Union League, Metropolitan and St. Anthony clubs of New York, also of the Jekyll Island and Rumson Country clubs.

Joseph Boyd Baker, superintendent of the Philadelphia Terminal division of the Pennsylvania Railroad at West Philadelphia, Pa., died on February 3. He was born in August, 1853, and received his education at Lehigh University. He entered the service of the Pennsylvania Railroad in July, 1884, as a rodman at Altoona, Pa. He was made assistant supervisor at Lewistown in March, 1885, and held the same position subsequently on the Middle division, the Maryland division and the Pittsburgh division, becoming supervisor of the Monongahela division on March 6, 1889. He was transferred the following December as supervisor to the Philadelphia division and in October, 1895, became assistant engineer of the Middle division of the Philadelphia & Erie. He was transferred as assistant engineer in March, 1897, to the Pittsburgh division, and was again transferred in the same capacity in January, 1899, to the Philadelphia division. In February, 1902, he was appointed superintendent in charge of the Frederick division; four months later he was made superintendent of the Cambria and Clearfield division, and since November 1, 1902, he was superintendent of the Philadelphia Terminal division.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Illinois Central is in the market for 70 locomotives.

The Buffalo, Rochester & Pittsburgh is in the market for locomotives.

The Lake Erie, Franklin & Clarion has ordered one ten-wheel passenger locomotive from the American Locomotive Company. This locomotive will have 18½ x 26 in. cylinders, 63 in. driving wheels and a total weight in working order of 144,000 lb.

Dolese & Shepard, Chicago, have ordered one four-wheel switching locomotive from the American Locomotive Company. This locomotive will have 18 x 24 in. cylinders, 47 in. driving wheels, a total weight in working order of 103,000 lb., and a steam pressure of 180 lb.

The Detroit Terminal has ordered 3 six-wheel switching locomotives from the American Locomotive Company. These locomotives will have 21 x 28 in. cylinders, 57 in. driving wheels, a total weight in working order of 170,000 lb., and a steam pressure of 180 lb. They will be equipped with superheaters.

CAR BUILDING

The Bangor & Aroostook is in the market for 85 flat cars.

The Chicago & Northwestern is inquiring for 900 steel center sills.

The Buffalo, Rochester & Pittsburgh has ordered 500 box and 500 gondola cars from the Standard Steel Car Company.

The Southern Railway is reported to be inquiring for 3,500 freight cars and 50 or 100 passenger cars. This item has not been confirmed.

The Virginian, reported in the *Railway Age Gazette* of January 16 as being in the market for 1,000 gondola cars, is now negotiating with the builders on the basis of revised specifications.

The Atchison, Topeka & Santa Fe, which recently placed a large order for cars, is now reported to be in the market for 1,000 additional freight cars. This item has not been confirmed.

The Union Tank Line, which was reported in the *Railway Age Gazette* of January 16, as being in the market for 500 tank cars, has ordered 1,000, 8,000 gal. capacity tank cars from the American Car & Foundry Company.

Russian Railway Supplies.—At a recent meeting, a committee, under the presidency of the assistant minister of Ways of Communication in Russia, passed a resolution that private railway companies should have the right to order their requirements abroad if the price of Russian goods should be from five to eight per cent. higher than that of the foreign goods, plus the customs duty. At the same meeting it was decided that private railway companies should also have the right to build rolling stock in their own workshops, but that the amount so built should be limited to a certain fixed percentage of the total rolling stock of the given railway. That percentage, however, has not yet been fixed.

Electrification of the St. Gothard Railway Between Switzerland and Italy.—The Swiss federal council is reported to have recently published the project of the work for the electrification of the St. Gothard railway. One of the first things will be the construction of two central electric stations, one near Lake Koton and the other near Amstey. From these a current will be carried through Bellinzona, Ariolo and Esstfeld, and will be extended later to all of the St. Gothard line. Other works are also included in the great undertaking, among them being the enlargement of the international station at Chiasso, the station of Lucerne, the construction of a tunnel at the foot of Monteceneri, and double-tracking of the line between Chiasso and Bellinzona, upon which work has already been commenced.

Supply Trade News

The B. Hardesty Manufacturing Company, Denver, Col., has taken over the American ingot iron culvert business of the Colorado Ingot Iron Pipe & Culvert Company.

Karl A. Heine has joined the sales department of the Chicago Car Heating Company, Chicago, and will be connected with the New York office at the Grand Central Terminal.

D. W. Bowman, formerly chief engineer, on February 1 became consulting engineer of the Phoenix Iron Company, Philadelphia, being succeeded as chief engineer by Norman R. McLure.

The Chicago Car Heating Company has recently opened a branch office and factory at 61 Dalhousie street, Montreal, to take care of its business in Canada. A. D. Bruce, of Guelph, Ontario, formerly the purchasing agent of the company at Chicago, has been placed in charge.

A. C. Adams has resigned his position of superintendent of motive power of the Spokane, Portland & Seattle to become the Pacific coast general agent of the General Brake Shoe & Supply Company, Chicago, and will have headquarters at 907-908 Wilcox building, Portland, Oregon.

A. H. Weston, for many years mechanical engineer of the T. H. Symington Company and located for the past two years at Rochester, N. Y., has been transferred to the sales department of that company. He will report to C. J. Symington, vice-president in charge of sales with offices at 30 Church street, New York.

The Whiting Foundry Equipment Company, Harvey, Ill., has arranged with S. R. Vanderbeck, 217 Walnut street, Philadelphia, Pa., to have him handle that company's complete line in Philadelphia territory. Mr. Vanderbeck also represents the Atlas Car & Manufacturing Company, Cleveland, O.; Orton & Steinbrenner, Chicago, and the New Jersey Foundry & Machine Company, New York.

TRADE PUBLICATIONS

CARS.—The Gregg Company, Ltd., Hackensack, N. J., has recently issued a supplement to its catalog No. 48 to illustrate some of its new designs and improvements in car construction.

PIPE.—The National Tube Company, Pittsburgh, Pa., has recently issued bulletin No. 18A, illustrating National reamed and drifted pipe and various pipe accessories.

BALL BEARINGS.—The S. K. F. Ball Bearing Company, New York, has recently issued an 85 page bulletin describing the S. K. F. ball bearings and illustrating typical installations. There are also included tables of dimensions and load ratings of the various types of self-alining, single thrust and double thrust bearings. This company has its main works at Gothenberg, Sweden.

CRANES.—The Browning Company, Cleveland, Ohio, has recently issued a very commendable catalog illustrating its line of locomotive cranes. A small portion of the book is devoted to a description of the integral parts of the mechanism. The major part containing approximately one hundred twenty excellent half-tone engravings is used to illustrate many of the Browning crane installations. A very wide adaptability is shown therein for all kinds of service in railroad and industrial company work.

LOCOMOTIVE RATIOS.—Bulletin No. 1017 from the American Locomotive Company, New York, has been prepared by F. J. Cole, chief engineer of that company, and deals with the subject of locomotive ratios. This bulletin contains a great deal of valuable information for locomotive designers. It includes a number of diagrams and tables, among which are curves of tube and flue temperature, speed factor and horse power, and tables giving the cylinder horse power of both saturated and superheated locomotives for various pressures and cylinder diameters. There is also a full page table giving the evaporation for tubes and flues in pounds of steam per hour per square foot of outside surface.

Railway Construction

BLACK MOUNTAIN.—This road has been extended from Pensacola, N. C., to Escota, 3.6 miles.

CALIFORNIA WESTERN RAILROAD & NAVIGATION.—This company's railroad is now in operation from Willits, Cal., west to Fort Bragg on the Pacific coast, 40 miles.

CANADIAN NORTHERN.—The Shellbrook sub-division of the Western division has been extended from Blaine Lake, Sask., southwest to Denholm at the junction with the Battleford subdivision, 52.5 miles.

CENTRAL OF MARYLAND.—See Northern Central.

COLORADO ROADS.—Plans are being made to build a line from Grand Junction, Colo., southwest through Colorado, New Mexico, Arizona, Utah and California to San Diego, Cal., about 1,000 miles It is said that surveys for the proposed line have been completed and application will be made for the necessary right of way over the public lands. Charles C. Carnahan, Chicago, and residents of western states are interested in the project.

LOUISIANA & PACIFIC.—The De Ridder branch has been extended from Bundick, La., to Hoy, 6 miles.

MERIDIAN & MEMPHIS.—This company, which operates a line from Meridian, Miss., northwest to Union, 32.6 miles, is making surveys, it is said, for an extension northwest to Carthage, about 30 miles.

MINNESOTA NORTHWESTERN ELECTRIC.—An officer writes that this company was incorporated last September in Minnesota with $500,000 and headquarters at Thief River Falls, Minn., to build a system of suburban lines out of Thief River Falls. Work is now under way on the first section of 20 miles from Thief River Falls, east via Mavie to Goodridge, from which place the company plans to build three lines, one northeast via Grygla and Malcolm; another east via Torgerson, Jelle and Thorhult, and a third from Goodrich south to Highlanding, thence east via Hilda and Neptune to Oak Point. Two branches are projected from the latter line southeast, one from Hilda and the other from a point west of Oak Point. A line is also projected from Mavie northeast to Germantown, thence north via Rollis, Gatzke and Eddy to Roseau. The company expect to have work finished on the first 20 miles to Goodrich by September of this year. Daniel Shaw, president; H. W. Protzeller, general manager, and G. H. Martz, chief engineer.

MURFREESBORO ELECTRIC.—This company, which was organized some time ago to build a line from Nashville, Tenn., southwest via Murfreesboro to Woodbury, about 50 miles, is now making surveys on the section between Nashville and Murfreesboro. R. C. Wilson, president, Nashville, and G. B. Howard & Co., are the engineers.

NEWARK & MARION.—The Newark, Williamson & Northern has been incorporated in New York with $150,000 capital to build an extension of the Newark & Marion from Marion north to Williamson. The Newark & Marion now operates nine miles of road from Newark north to Marion. Residents of Syracuse and Williamson are back of the project.

NEWARK, WILLIAMSON & NORTHERN.—See Newark & Marion.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, is asking for bids, until March 2, for the construction of section No. 4 of Routes Nos. 4 and 38 of the Seventh avenue subway in the borough of Manhattan, in Seventh avenue and Seventh avenue extension between Commerce street and Sixteenth street. The plans call for a four-track subway, with an express station at Fourteenth street, and a local station at Christopher street.

NORTHERN CENTRAL.—Work on the Central of Maryland, from a point on the York, Hanover & Frederick 2,800 ft. south of the center of Keymar station, Md., thence along Little Pipe creek to a connection with the Tidewater Portland Cement Company's tracks at Union Bridge, 5.16 miles, has been completed and the new line is now being operated as a part of the Baltimore division.

Nueces Valley, Rio Grande & Gulf.—An officer is quoted as saying that construction work will soon be started on the line projected from Kittie, Tex., on the San Antonio, Uvalde & Gulf, in Live Oak county, to the center of McMullen county, 25 miles. W. A. Matthaei, president, and J. W. Brooks, chief engineer, Billeville. (October 17, p. 727.)

Pennsylvania Railroad.—The Rice's Landing branch of the Monongahela division has been extended from Rice's Landing, Pa., to Crucible, 1.8 miles.

Quanah, Acme & Pacific.—This road has been extended from Roaring Springs, Tex., to MacBain, 3.3 miles.

San Benito & Rio Grande Valley.—This company, which operates lines in the lower Rio Grande valley in Texas, aggregating 65 miles, is planning the immediate construction of extensions as follows: From the Rio Hondo line, about a mile east of San Benito, to a connection with the main line at Fernando, forming a loop line of about 25 miles, and from Santa Maria, the present terminus of the Western division out of San Benito, to Latonia. The latter line is to connect with the short line running south from Mission, 29 miles. (September 12, p. 479.)

Tennessee & Alabama.—This company has under consideration the question of building a line, it is said, from Huntsville, Ala., north to Fayetteville, Tenn., about 35 miles. J. E. Hurd, chief engineer, Fayetteville, Tenn.

RAILWAY STRUCTURES

Albany, N. Y.—The Delaware & Hudson has given a contract to J. Henry Miller, Inc., Baltimore, Md., it is said, for putting up a new office building and freight house at the foot of State street, in Albany.

Cape Charles, Va.—The New York, Philadelphia & Norfolk has awarded a contract to the Roberts & Schaefer Company, Chicago, for the building of a large reinforced concrete fireproof (Holmen type) locomotive coaling and sanding plant, which will be built immediately at Cape Charles, Va. The contract price is $17,000.

Chicago, Ill.—The Roberts & Schaefer Company, Chicago, has been awarded a contract for the building of a 400-ton reinforced concrete automatic electric coaling and sanding plant, designed to coal locomotives on four tracks for the new clearing yard at Chicago, now being built by the Chicago & Western Indiana and the Belt Railway of Chicago. The Holmen type coal bucket will be used. The contract price is approximately $25,000.

Dante, Va.—The Roberts & Schaefer Company, Chicago, has been awarded a contract by the Carolina, Clinchfield & Ohio, for the building of a fireproof reinforced concrete coaling and sanding plant at Dante, Va., using the Holmen type bucket. The contract price is approximately $15,000.

Elizabeth City, N. C.—The Norfolk Southern has given a contract to F. F. Muth & Son, Edenton, N. C., it is said, to build a new passenger station at Elizabeth City. The improvements will cost about $16,000.

Irvine, Ky.—The Louisville & Nashville is building with its own forces an eight-stall roundhouse, and is also putting up small shop buildings at Irvine.

Ottawa, Ont.—The National Transcontinental Railway of Canada has awarded a contract to the Roberts & Schaefer Company, Chicago, for six large reinforced concrete locomotive coaling plants using the Holmen type coal bucket. The contracts are worth approximately $115,000.

Pocatello, Idaho.—The Oregon Short Line has announced its intention of erecting a three-story depot.

Vancouver, B. C.—Bids are wanted by Eustace J. Cockrell, secretary of the Burrard Inlet Tunnel & Bridge Company, 513 Carter Cotton building, Hastings street, Vancouver, B. C., until April 1, 1914, for the construction of a bridge over the Second narrows of the Burrard Inlet to connect Vancouver with North Vancouver. The bridge is to carry a single track for steam roads and two tracks for electric cars.

Railway Financial News

Baltimore & Ohio.—See Union Pacific.

Chicago, Rock Island & Pacific.—Phelps, Dodge & Company have issued the following statement to their stockholders:

"As numerous articles have recently appeared in the daily papers, connecting Phelps, Dodge & Company with the Rock Island Railroad Company, and intimating that Phelps, Dodge & Company had not only been large buyers of Rock Island stocks, but had obtained the control of the property, we therefore consider it only right and proper to advise our stockholders officially that Phelps, Dodge & Company has never had a single share of Rock Island stock, or invested one dollar of money in any of these securities.

"The El Paso & Southwestern Company, in which some of our stockholders are interested, purchased some years ago a small minority interest in Rock Island preferred stock, and has never increased or diminished its holdings since that date."

[It will be noted that this is a notice to stockholders of Phelps, Dodge & Company, and no mention is made of any personal interests that those associated with Phelps, Dodge Company may have in Rock Island.]

Detroit, Toledo & Ironton.—Judson Harmon, chief counsel for the reorganization committee, has presented the plan of reorganization to the Public Utilities Commission of Ohio, who sat in joint session with two members of the Railroad Commission of Michigan. The reorganization plan was outlined in the *Railway Age Gazette* of December 26, 1913, page 1,250. The plan of reorganization having been declared operative, the final installment of the assessment has been called for payment on February 16.

Galveston, Houston & Henderson.—Stockholders have voted to approve the authorization of $5,000,000 bonds, of which $2,000,000 are to be issued in the near future to refund a like amount of maturing obligations, and the remainder to be spent on additions and betterments, but not including double tracking between Houston and Galveston.

Southern Pacific.—This company has applied to the State Railroad Commission of California and the Corporation Commission of Arizona for authority to issue $55,000,000 5 per cent. 20-year convertible bonds. Of the proceeds from these bonds $26,000,000 are for refunding purposes and the remainder for additions, betterments and extensions.

Union Pacific.—In reply to protests of preferred stockholders against the distribution of Baltimore & Ohio stock to Union Pacific common stockholders, Chairman Lovett has issued the following statement:

"The distribution is of accumulated surplus profits plainly applicable as dividends only on common stock and is chargeable to surplus and not capital.

"There is nothing in the convertible bonds or in the indenture under which they were issued that impairs the ordinary right of stockholders to a distribution at any time of the entire profits or that limits the power of the company with respect to rate of dividends, increase of stock, reduction of surplus or otherwise.

"The company promised to pay the principal and interest and to convert bonds at a certain rate during a certain period at the option of the holder, and that was absolutely all it promised.

"The suggestions that had been made for a reduction of the convertible rate or for setting aside the securities for the benefit of convertible bondholders, whenever they choose to convert, were carefully considered, but are impossible because illegal and in plain violation of rights of common stockholders. Such action would be annulled by the courts, or, if effected, would render the directors personally liable.

"Our action was taken only after full consideration of the relative rights of holders of preferred stock, common stock and the convertible bonds, for all of whom we have felt we were trustees."